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ABSTRACT

Ten lesson plans in the basic area of home beautification are included in the guide for use by teachers in planning and conducting youth or adult farmer classes. The major emphasis of this unit is on landscaping. The development of a landscape plan, plant identification and selection, landscape construction and maintenance, and flower specialty gardens are topics covered in the lessons. Suggestions for teaching the lesson, enrichment activities, and teaching materials are included at the end of each lesson. Teaching forms and a unit evaluation questionnaire are appended. (VA)

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HOME BEAUTIFICATION

An Instructional Unit for Teachers
of Adult Vocational Education in Agriculture

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1973

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FOREWORD

Mr. Shirley Howard, teacher of vocational agriculture at Grant County High School, brings to this publication 15 years of teaching experience, including 4 years of teaching adult farmers and several years of work with adults in horticulture. Presently, he has responsibility for four horticulture classes at Grant County High School and management of a 28 x 50 foot greenhouse. Each year over $1,000 worth of bedding plants, tomatoes and potted plants is sold from the greenhouse. He holds the B.S. and M.S. degrees from the University of Kentucky. He has been District KVATA president and is currently Executive Secretary of the Grant County Education Association and is on the Board of Directors of UNISERVE, Unit 6 of K.E.A., and is active in many local organizations. He has accumulated an extensive library on horticulture and landscaping, and has put many ideas into practice on his 3-acre home lot in Williamstown, Ky.

This adult course is a result of the following sequence of actions:

1) The State Advisory Committee, made up of agriculture teachers, State staff, and teacher educators from throughout Kentucky, was organized to determine needs and program direction for adult work in agriculture for the State. A major outcome of the first meeting in September, 1971, was a recommendation that more instructional materials that are specifically

designed for teaching adults in agriculture be developed and distributed to teachers.

2) Subsequently, a proposal to involve experienced teachers of adults in material development was written by Dr. Maynard Iverson of the University of Kentucky and submitted for State funding. In January, 1972, a two-year, special grant was made through the Supporting Services Division, Bureau of Vocational Education, State Department of Education.

3) Twelve teachers were selected to produce units in the diverse areas of need during the course of the project.

This publication, along with other materials developed specifically for instruction of adults employed in agriculture in Kentucky, should improve the teaching of adult classes in agriculture and stimulate the initiation of additional classes.

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ACKNOWLEDGEMENT

We are grateful to the following for their valuable assistance with the unit: Professor Horst Schach, teacher of landscape design, College of Ag, and Dr. Frank Pattie, Professor Emeritus, both of the University of Kentucky, for critically reviewing the manuscript; Mr. Raymond Gilmore, and Mr. Steve Statzer, artists in the Curriculum Development Center, University of Kentucky; Mrs. Anne Mills, secretary, and Ms. Linda Ledford, Ms. Carol Ledford, Ms. Susan Roberts, typists, University of Kentucky; Dr. Herbert Bruce, Director CDC, for his advice and making available the resources of his unit; Dr. Robert Schneider, Director, Education Resources Development Unit, Bureau of Vocational Education, for expediting financing of the project, and especially to the many authors and agencies whose publications were utilized in the unit.

CONTENTS

Page

SUGGESTIONS FOR USING THE COURSE vi

UNIT OBJECTIVES viii

UNIT REFERENCES ix

LESSONS

1. Importance of Home Beautification 1

2. Development of the Landscape Plan 10

3. Plant Identification and Selection 58

4. Landscape Construction 98

5. Establishing Ornamental Plants 122

6. Establishment and Maintenance of Lawns 147

7. Landscape Maintenance 175

8. Establishing and Maintaining the Flower Garden . . . 218

9. Specialty Gardens 244

10. Plant Propagation 267

APPENDIX 286

CLASS PLANNING FORMS:

TEACHING PLAN FOR THE COURSE 287

TOPIC PLANNING FORM 288

RESOURCE MATERIAL LIST 289

UNIT EVALUATION QUESTIONNAIRE 290

SUGGESTIONS FOR USING THE COURSE

This unit was developed as a guide for use by teachers in planning and conducting young farmer and/or adult farmer classes. Because of the diversity in age, expertise and experience levels of class members and instructors, the unit was designed to cover the basic areas of Home Beautification. Therefore, teachers should adapt those portions of the unit that are suited to their particular situation. Ten lessons have been included, but the unit may be expanded to more topics or utilized in diversified courses for shorter periods of instruction. It may be helpful to involve class members at the organizational meeting in the selection of lessons and activities. Planning forms to assist in this process are found in the appendix. We highly recommend that the major teacher references, Landscape Design (Penn State), Landscaping Your Home (Nelson, University of Illinois), and Landscaping Your Home (Ohio State), be secured by anyone planning to utilize this unit.

The format used was designed to assist teachers in utilizing problem-solving and the discussion method. A teaching procedure that has been used successfully is as follows: Step 1: The teacher lists the topic (problem and analysis) on the chalkboard. Step 2: He then sets the stage for discussion with introductory facts, ideas, or comments, using items from the section on "developing the situation." Step 3: The teacher calls on the class to give their experiences, ideas, and knowledge concerning the subject. The discussion is supplemented with handouts, transparencies, models, or other inputs gathered by the teacher beforehand to help solve the problem under consideration. Resource people or films may also be used here as sources of information. (Transparency and handout masters are found at the end of each lesson in the unit.) Step 4: When the facts have been brought out and a good discussion has taken place, the teacher leads the group to appropriate conclusions. These summary statements are written on the chalkboard and, in some cases, are typed up and distributed as handouts at the next meeting. Some instructors will utilize devices such as panels, exhibits and tours to reinforce the conclusions reached. Several suggestions for supplementary enrichment activities are listed in each lesson of this unit.

Teachers may want to utilize the wealth of resources found in each community to supplement their teaching -- local nurserymen, area Extension Specialists, newspaper garden editors, Garden Clubs of Kentucky representatives, and others will undoubtedly be pleased to serve as resource people, furnish samples, give demonstrations, conduct tours, arrange for films and assist with other activities appropriate to the success of the course.

Each teacher using the unit is asked to complete and return the evaluation questionnaire found in the appendix. These ratings and suggestions will be used to improve this unit as well as others developed in the future.

Our best wishes for a successful adult program.

Shirley R. Howard
Development Consultant

Maynard J. Iverson
Project Director

UNIT OBJECTIVES

Major Objective: To develop the effective ability of home owners to improve the beauty of the home and its surroundings.

Lesson Objectives: To develop the effective ability of home owners to:

1. Appreciate the need for an attractive home
2. Develop a workable landscape plan
3. Properly identify and select the proper ornamental plantings
4. Properly construct landscape features
5. Properly establish ornamental plants
6. Successfully establish and maintain lawns
7. Properly maintain the home surroundings
8. Successfully establish and maintain the flower garden
9. Properly establish and maintain specialty gardens
10. Successfully propagate ornamental plants

UNIT REFERENCES

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Grounds Maintenance Handbook, H. S. Conover, McGraw-Hill Book Company, New York, 1958.

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Useful Trees and Shrubs, Florence B. Robinson, Garrard Publishing Company, Champaign, Illinois.

Vines, Ground Covers and Espaliers, Correspondence Course No. 140, The Pennsylvania State University, University Park, Pa.

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Flower and Garden, May 1973, Mid-America Publishing Corporation.

We also recommend utilizing the many related publications available from the U. K. Extension Service and USDA.

Lesson 1

IMPORTANCE OF HOME BEAUTIFICATION

Objective -- To develop the effective ability of home owners to appreciate the need for an attractive home.

Problem and Analysis -- What is the need for beautifying the home and surroundings?

- -Beauty
- -Comfort
- -Privacy
- -Ease of maintenance
- -Convenience and safety
- -Flexibility of use
- -Increase in property value

Content

I. Beauty

A. Achieving a beautiful and neat home and surroundings can help to satisfy outdoor interests and creative impulses.

B. It increases pride in home ownership.

C. A beautiful home and surroundings may improve one's desire to do higher quality work.

D. The beauty of a well-landscaped home reflects the owner's pride in the appearance of his home ground.

E. One purpose of landscaping is to provide beauty for:

1. The owner
2. Neighbors
3. Passing traffic

F. All persons do not use the same aesthetic yardstick when looking at a home and its surroundings. There are, however, certain standards and recommendations upon which most experts agree. If a person does not stray too far from these concepts he can be reasonably assured that his landscaping will meet with general approval.

G. A beautiful setting is achieved only through planning. What a person sees from his home is his landscape--whether he owns what he is looking at or not.

II. Comfort

A. Trees can filter bright sunlight and absorb heat--the temperature beneath a tree may be 15° to 20° lower than in the sun. A deciduous tree placed on the west or southwest side of a home will provide welcome shade in the summer, while in the winter its open branches will permit the penetration of sunlight and warmth.

B. A row of trees and shrubs will absorb annoying winds.

C. The proper placement of plants can soften the level of unpleasant sounds entering the house and yard.

D. Thick foliage can help reduce dangerous pollutants in the air while freshening it with oxygen.

III. Privacy

A. A provision of shelter from the outside world, a place for adult relaxation and for children to play; this is the role of the private area.

B. The private area may be thought of as two units:
   1. The patio area -- This area is best located near the house, with an easy access from the house.
   2. The recreation area -- This area typically consists of an open expanse of lawn with trees and shrubs used to create privacy and enclosure.

IV. Ease of Maintenance

A. There is no way to completely eliminate all garden work but, with proper planning, the load may be reduced considerably.

B. Time, manpower, and dollars can be saved with an efficient design. This gives a person more opportunity to enjoy the grounds.

C. Some recommended practices in reducing maintenance include:

1. Use raised planting beds and plant containers to reduce stooping, eliminate grass invading the flower beds, and eliminate children from passing through the bed.
2. Where raised planting beds are not used, the establishment of mowing strips between shrubs and the lawn will help eliminate the tedious job of edging.
3. The selection of slow growing shrubs to reduce the continual pruning which is the result of planting a fast-growing shrub.
4. Using mulches and low ground-cover which:
    - a. Help unify taller plantings
    - b. Hold moisture
    - c. Restrict weed growth
    - d. Cover steep slopes, bumpy areas and otherwise hard-to-mow areas
    - e. Reduce soil erosion

V. Convenience and Safety

A. Here, again, a person should realize the importance of planning so that there is no question as to how to get from place to place. Example: In a home designed with the family entrance as well as the visitor's entrance facing the street side, planning is needed so that persons calling will know which entrance to use.

B. Think of convenience and safety as an integral part of the plans for:

1. The width of the garage
2. The slope of a driveway or bank
3. The height of a step
4. The width of a walk

5. The location of shrubs in relation to walkways
6. The location of walks, drives, patios and parking areas

VI. Flexibility of Use

A. The most useful gardens are those which allow a variety of activities in the same area. In addition, flexibility is essential because change is inevitable in a garden.

B. A lawn may be used for a tennis game in the afternoon, a cookout in the evening, and something pleasing to look at the rest of the time.

C. The service area can provide space for the clothesline, vegetable garden and compost pile, in addition to many other functions.

VII. Increased Property Value

A. Good landscaping indirectly improves the value of property in several ways:
  1. Prospective buyers are more attracted, and are, therefore, more apt to buy a home that has been properly landscaped than a new house set on raw scarred land.
  2. Attractive landscaping will increase the resale value of an older house.
  3. Buyers can also be caused to realize the value of having an established landscape, rather than having to bear the expense and labor involved in landscaping and beautifying the area themselves.
  4. A well-designed landscape adds approximately ten percent to the value of the property, upon establishment. This value increases each year as the plants develop and grow to maturity.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
  1. A question such as: "Are you proud of the

appearance of your home (or homestead)?" could be used.

2. A person's home deserves the most attractive setting that it can be given.
3. When the home was bought, provision was made for the family's comfort and convenience by choosing a house with adequate sleeping areas, storage space, and living areas. Equal consideration should be given to the space surrounding the home. If this space is properly developed, many of the family activities can be extended into outdoor living areas.
4. Today's viewpoint on landscaping is the result of a basic change in its primary purpose. At one time landscaping and home beautification was intended mostly to impress other people--for show. Today, the basis for landscaping and home beautification is not so much as a means to impress, but to make the grounds usable, livable extensions of the house itself. Good landscaping creates outdoor rooms, or areas, to be treated and used the same way indoor rooms are. In many homes the living areas have been moved around. They no longer face the front, but backward to the garden. The front porch is being replaced by a private garden in the back. As a result of this transition, the backyard is no longer just a place for garbage cans, clothes drying, garages and vegetable gardens, but a natural setting for relaxation, entertainment, and family games. Service functions have been compressed into one area. The garage is alongside, or even a part of, the house. Tools and utilities are stored out of sight. The front yard is slipping in its role as _just_ a showplace; it still supplies attractive plantings, but it is also a usable area for visitors who no longer arrive on foot, but in cars, which must be parked.
5. Today's practices seek to achieve a combination of:
   a. Beauty
   b. Comfort
   c. Privacy
   d. Ease of maintenance

e. Convenience and safety
f. Flexibility
g. Increasing property value

B. Things to be brought out by the class members:
   1. Their interest in landscaping and beautification
   2. Some indications of their knowledge and experiences on this subject
   3. Opinions as to what they want landscaping' to do for them

II. Conclusions

A, A beautiful home and attractive surroundings are a source of pride for the owner, resulting in a more pleasing attitude toward life, work and the people with whom he associates.

B. A properly landscaped home is one where:
   1. A person can find privacy for reflection and relaxation.
   2. A person can entertain without being on display for the neighbors, and where he does not have to witness their activities.

   3. A minimum of maintenance provides a maximum of returns in usefulness, beauty, etc.

C. A source of pride to any homeowner is a home planned for convenience and safety, especially in areas such as garages, driveways, walks, steps, plantings, etc.

D. Any home (or farmstead) properly planned with all the foregoing factors in mind will automatically increase in value, and with proper maintenance, will continue to increase in value as plantings mature.

III. Enrichment Activities

A. A trip through the countryside or a residential urban area to observe landscaping

B. Use any horticultural experts available

C. Slides of problem areas and/or beauty spots

IV. Suggested Teaching Materials

A. References for Lesson 1
   1. Approved Practices in Beautifying the Home Grounds, Norman K. Hoover, The Interstate, Danville, Illinois.
   2. Better Homes and Gardens Landscape Planning, Meredith Press, Des Moines, Iowa, pp. 7-14.
   3. Ladies Home Journal Book of Landscaping and Outdoor Living, Richard Pratt, Grosset and Dunlap, New York, N.Y., pp. 17-33.
   4. Landscape Design, A Teachers' Manual, The Pennsylvania State University, University Park, Pa., pp. 7-9.
   5. Landscape Design by E. Wesley Conner, Vocational Education Publications, San Luis Obispo, California, pp. 7-10.
   6. Landscape Gardening, James Underwood Crockett and the editors of Time-Life Books, Time-Life Books, New York, pp. 7-15.
   7. Landscaping Your Home, William R. Nelson Jr., University of Illinois College of Agriculture Cooperative Extension Service, Circular 858.
   8. Planning the Home Landscape, Kentucky, Unit HS-81.

B. Resource personnel
   1. Consult local sources
   2. Cooperative Extension Specialists
   3. For specific personnel consult VoAg Directory of Resource People in Kentucky.

C. Audio-visuals
   1. Masters*
      -1 Need For Home Beautification
      -2 Cost/Benefits of Home Landscaping

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*Masters are keyed to units and lessons, and are numberd consecutively. The code number appears in the lower right hand corner. Master "Adult 110 - 1A" indicates adult unit 110, lesson 1, item 1, part a (if there are several sheets).

IV. Suggested Teaching Materials

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  1. Approved Practices in Beautifying the Home Grounds, Norman K. Hoover, The Interstate, Danville, Illinois.
  2. Better Homes and Gardens Landscape Planning, Meredith Press, Des Moines, Iowa, pp. 7-14.
  3. Ladies Home Journal Book of Landscaping and Outdoor Living, Richard Pratt Grosset and Dunlap, New York, N.Y., pp. 17-33.
  4. Landscape Design, A Teachers' Manual, The Pennsylvania State University, University Park, Pa., pp. 7-9.
  5. Landscape Design by E. Wesley Conner, Vocational Education Publications, San Luis Obispo, California, pp. 7-10.
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NEED FOR HOME BEAUTIFICATION

--Beauty

--Comfort

--Privacy

--Ease of Maintenance

--Convenience and Safety

--Flexibility of Use

--Increase in Property Value

COST/BENEFIT OF HOME LANDSCAPING[A]

ITEM	COMMERCIAL[C]	INDIVIDUAL[B]
Landscape Design (site and family analysis, soil test, drawing, consultations)	$ 200.--	--
Landscape Construction		
Patio - 12' x 25'	650.--	300.--
Fences - 200'	500.--	200.--
Barbecue grill - (gas)	150.--	75.--
Plantings		
Lawn (leveling, seed, mulch, fertilizer)	300.--	100.--
Trees (balled, six, 2-3")	300.--	180.--
Shrubs (incl. hedge; balled) - 40	400.--	200.--
Total Cost	$2500.--	$1055.--
Added value to the home - 10% x 25,000 =	2500.--	2500.--
Net Gain	-- + Aesthetic Value	$1445.-- + Aesthetic Value

A. Assuming a $25,000 home with graded, but undeveloped, standard lot (75' x 150'); driveway and walks completed.

B. This assumes the individual will provide all labor and materials will be purchased at average retail.

C. Assumes use of a commercial landscape service; figures include labor.

Lesson 2

DEVELOPING THE LANDSCAPE PLAN

Objective -- To develop the effective ability of home owners to devise a workable landscape plan.

Problem and Analysis -- How can we develop a landscape plan that will meet our immediate and future needs?

- Making a map
- Elements of design
- Principles of design
- Site analysis
- Analysis of family needs
- Planning the landscape areas
- Basic guidelines for landscaping

Content

I. Making a Map

A. One of the first and most important steps in planning an attractive and usable home is to draw a map of the area and buildings to be landscaped.

B. The following is a suggested procedure:

1. The map may be drawn on any suitable blank paper or graph paper.
2. Select a scale for the drawing. If using the cross-section paper, each square should represent a definite number of feet (8, 10, 12, etc.)
3. Develop the overall dimensions. Mark the boundary line first, then locate the house on your plan. From each corner of the house measure the distance to two adjoining boundary lines. In this way a person can mark each corner of the house on the plan. Connect the marks made on the graph paper for each corner of the house. Use of the surveyor's plat map is helpful here.

4. On the house outline, indicate doors and windows. Use the same process for locating additional features, such as:
    a. Existing trees
    b. Walls
    c. Fences
    d. Septic tanks, etc.
    e. Water lines and other utilities
    f. Walk, steps, driveways, etc.

NOTE: If the house is an older one it may be desirable, at this point not to add these walks, drives, or existing plant material other than large trees. This may keep the plan from failing if a person feels wedded to things as they are, even if he does not particularly like them.

    g. Garden and/or fruit area
    h. Front lawn or public area
    i. Private or living area
    j. Recreational area
    k. Service area
    l. North point
    m. Scale used

II. Elements of Design

A. Texture

1. Texture refers to the surface quality of a plant.
2. It is related to how we judge visual depth.
3. Plant texture is determined primarily by:
    a. Structure of the plant growth
    b. Size and shape of branches, leaves, and twigs
    c, Relative courseness of surrounding materials
4. Some things which make a plant have coarse or fine texture are:
    a. Leaf size. Small leaves give fine texture, while large leaves result in coarse texture.
    b. Spacing of leaves. Wide-spaced leaves appear coarse, while close-spaced look fine.
    c. Leaf division and shape. Compound and deeply lobed leaves appear to have a finer texture than leaves of the same

size with regular, or smooth edges.

- d. Length and stiffness of petiole (the connecting portion between blade and stem). Plants with a stiff petiole are course in texture; those with a limber petiole are fine textured.
- e. Gloss. Shiny surfaces appear coarse in texture, while dull surfaces look fine-textured.
- f. Density and form. Dense, compact plants appear fine textured, while thin, open-growing plants look coarse textured.
- g. Seasonal variation. Deciduous plants generally appear to have a fine texture when fully leaved and a coarse texture after the leaves have dropped.

B. Color

1. Color refers not only to the flowers and fruit, but also to the foliage and bark.
2. Flowers and fruit occur in practically all shades and intensities. Care must be taken when combining colors that are in sharp contrast to each other; by using a color wheel, one can pick colors that blend well for a effect with just the strong accent needed to emphasize a part of the yard.

C. Mass

1. This refers to the "weight" of a plant by appearance. It is determined by both color and texture.
2. Plants light in color are light in mass; plants dark in color are greater in mass or weight.
3. Thin plants (with the structure exposed and irregular in form) are light, or have little mass; large and dense plants have more mass.

D. Line and Form

1. Shapes may be geometrical (rectangles, squares, circles, arcs--segments of circles--or free-form designs--asymetric shapes bounded by irregular lines).

III. Principles of Design

A. Lines determine shapes. Flowing lines should be sought after, rather than harsh straight or block designs.

B. Rhythm involves our perceptions as we move through the landscape; it is desirable and can be accomplished by repeating a particular design element in a sequential manner.

C. A balanced planting is a harmonious planting. One must think in terms of the plant masses, not shapes or sizes. Balance is achieved by equalizing the masses of plants, or by balancing colors between one location and another. Balance can also be attained by either symmetrical or asymmetrical arrangement.

1. Symmetrical is formal landscaping, where a plant in one location is the exact duplicate of one in the opposite location.
2. Asymmetrical is informal landscaping. For example, a large tree in one location will balance several small trees in the opposite location. This type of approach is more in keeping with most modern homes today.

D. Focalization, the accent or point to which attention is drawn, should be limited. In the front area, the main focal point is the entrance. All plantings used are subordinate to this point. If a planting has too many focal points the effect will be distracting, restless and confusing.

E. All elements of the design should be to scale. This refers to the size of plants used in relation to the setting. A large shade tree needs an area in scale with its size or it will look crowded and uncomfortable with the effect of "dwarfing" the appearance of the size of the home. A low, ranch-style home needs a low-growing shade tree in order to achieve a sense of proportion.

F. Simplicity

1. This means the repetition of landscape materials; it may involve repeating colors, textures or a few well-arranged forms in various areas.
2. The use of too many different kinds of plants will destroy simplicity, however, some variety in the choice of plants and other landscape materials will need to be used. This gives added interest to the home grounds.

IV. Site Analysis

A. Slope factors

1. One of the first considerations in landscape planning is the original shape of the surface.
   a. Study the natural ground forms, looking for the inherent beauty, to decide how to best adapt existing grades so that they will be beautiful as well as usable.
   b. Keep enough of the present elevations, forms and shapes of the land so that the overall design is in harmony with the surrounding area.
   c. Try to make the best use of the elevations that naturally exist on the property.
2. On the plan, be sure to note the direction and amount or degree of the slope.
   a. These are important in determining the drainage pattern.
   b. In cases where there are steep slopes to contend with, contour lines will need to be drawn on the plan.
3. Rolling land offers greater opportunity for interesting development than does flat land, but erosion, or the threat of erosion, may require additional construction and grading.
4. Grading may be necessary to:
   a. Shape the terrain so water will flow away from all structures, walks, surfaced areas, etc. On very flat land this may mean construction of a swale as a natural water outlet. An extremely steep land erosion may be a problem that must be controlled by vegetation or retaining walls.
   b. Fit all features of the plan to the site. This may include leveling an area for the house and an outdoor area such as a patio or terrace. In addition, it may be necessary to grade steep slopes in order to attain more gentle slopes for driveways or walks.
   c. Create a pleasing site appearance as a feature of the entire area. Steep

slopes can be made more pleasing and useful if they are graded into terraces.

5. For new construction, when a person has decided on a slope design, the topsoil should be stripped and stockpiled for later replacement.
6. When grading, certain minimums are required to insure good surface drainage and proper relationship of elements within the site development plan. No surface should have less than a 2-3% (2-3 feet per 100 feet) slope. This is minimum for lawns and seeded areas; a more desirable slope to 100 to 2.
7. One major reason for grading is to provide good drainage. Grading should be done so that surface water is carried off gently to avoid erosion or diverting water directly onto neighboring property.
8. Subsurface water will drain downhill and seep into the basement unless diverted. For this reason a person will want to lay tile around the foundation footing to run this water into a dry well, sewer or street.
   a. In cases where the ground slopes toward the house, this problem can be partially solved by constructing a shallow depression around the house.
      1) Start grading a slope up toward the house at a spot approximately 16 feet away.
      2) Runoff water will then collect in this depression and be diverted away from the house.
   b. Before any grading is done, a person should check local ordinances concerning requirements and limitations.
   c. Use soil burms for privacy and sound barrier
9. When changing the height of the ground around a tree, a person should remember that there are roots under the area that will require some special protection.
   a. Physical damage to the roots will affect any tree. Many trees have their feeder roots near the surface, so if soil is added by filling, these roots will be denied the oxygen they

need, causing the tree to die. Conversely, if soil is removed, exposure and damage to these roots results, and the tree may die.

b. A good tree is well worth saving, so if the ground around a tree must be raised the soil should be held away from the trunk of the tree with a dry wall around the trunk area.
   1) This wall should be several feet away from the trunk of the tree.
   2) A 4-inch drain tile should be installed to lead water away from the trunk of the tree.
   3) A layer of gravel or crushed stone should be placed over the drain tile and original grade before adding the fill dirt.
   4) At intervals some distance away from the dry wall, a person should dig several holes to the original grade and place a 4 or 6-inch drain tile in the upright position to provide for water and air.
   5) Consult a landscape contractor.

c. In cases where it is necessary to lower the level of the original grade, a person will want to leave a generous undisturbed circle around the tree.
   1) When a deep cut is made it will probably be necessary to build a retaining wall to support the mound of soil left around the tree.
   2) If the change in level is not too great, make a gentle mound and seed it to grass or plant it in ground cover.
   3) Where retaining walls are constructed to save a tree, the top of the wall can be constructed so as to serve as a seat.

B. Soil quality
   1. Soil is the basis of essentially all gardening. Only when the soil is properly prepared can a person start to landscape.

Here again, wise planning will result in greater satisfaction and success.

2. The layers of soil to be considered here are the subsoil and topsoil.
    a. The subsoil is located beneath the surface layer. It varies greatly in composition from clayey to sandy.
        1) A very sandy subsoil retains little moisture.
        2) A clayey soil holds water (In fact, it may hold it so long that the plants are literally drowned.) In such a case it should be broken up or a drainage system installed.
    b. The topsoil layer is considered the "living" part of the soil. It consists of minerals, organic matter (sometimes referred to as humus), soil organisms, water and air.
3. Organic matter is the key to good soil. Decayed organic matter is called humus. It is constantly used and broken down, thus making it necessary to be replaced. Benefits from an adequate supply of organic matter include:
    a. Increases the speed of absorption of water by the soil.
    b. Increases the water-holding capacity.
    c. Improves the soil structure making it easier to work.
    d. Serves as a source of food for soil microorganisms, thus increasing their numbers and activity.
    e. Serves as a source of nutrients for plants (especially nitrogen).
4. The three kinds of soils are clay, sand, and loam.
    a. Clay present in large quantities makes the soil heavy and difficult to work.
        1) This soil is slow to warm up in the spring and slow to dry. When it does dry, it frequently forms a crust which acts as a barrier to water and air entering the plant root zone.
        2) The addition of organic matter or sand will improve this condition.

   - b. Sandy soils are easy to work, dry out fast, and warm up early in the spring.
      - 1) These soils do not retain water or fertility.
      - 2) The addition of organic matter will improve this soil.
   - c. The ideal soil for most purposes is "loom"; one that is a mixture of clay and sand with an adequate supply of organic matter.
- 5. Knowledge of soil reaction (whether the soil is acid or alkaline) is necessary in planning a home beautification program.
   - a. The reaction is measured by the pH scale.
      - 1) The scale goes from 0 to 14; 7 is neutral, above 7 is alkaline and below 7 is acid.
      - 2) The farther away from 7, on the scale, the greater the degree of acidity or alkalinity.
   - b. In considering the proper plants for the landscape, a person will find that their pH requirements vary. It is a definite requirement that the soil reaction be favorable to the desired plant.
      - 1) A soil can be made more alkaline by adding ground limestone.
      - 2) It can be made acid by adding sulfur or aluminum sulphate.
      - 3) Most plants prefer soil in the 6.5 to 7.0 range.

C. Access to water
- 1. Plants must have water in order to live and grow.
   - a. Too much water drives air from the soil and "drowns" the plants by forcing out the air they need.
   - b. An excess of water in the subsoil may need to be removed by tile drainage or some such system. This may be rather expensive, but it could be more expensive not to make this correction.
- 2. Even in the best soils it is often necessary to provide for artificial watering during prolonged dry spells.
- 3. Each landscape plan will need to show the

location of springs, streams, ponds, low areas where water collects and such related information. This will definitely influence the type of plants chosen for this area.

D. Climate. A major factor in developing a usable landscape plan, climate is determined by a combination of temperature, rainfall, and sunlight.
   1. Plants need to be selected according to their requirements for the factors which make up climate.
      a. The U. S. Department of Agriculture has prepared a plant hardiness zone map for the United States. On this map the country is divided into zones determined by the average minimum temperature for that region.
      b. The minimum temperature which a plant will tolerate and the length of time it will stand severe chilling is a critical factor in the selection and placement of plants.
         1) Even with this in mind the zone map is not entirely foolproof, but it is the best method available at present.
         2) Some plants may live where they are supposed to die; while others die where they apparently should live.
   2. In addition to the temperature of the surrounding air, an important factor is soil temperature.
      a. Soil temperature varies in different soils and in such areas as shades of trees and buildings.
      b. Differences in soil temperature may partially explain why some plants grow better in one garden area than in another.
   3. Microclimate (localized modifications of the general climate) exist and must be considered in plant selections. For example:
      a. The corner of a building may have much

higher winds than the sides.

b. Narrow spaces between the building and street, or driveway can act as wind tunnel. A person can alter this wind pattern considerably by proper plantings and fence locations.

E. Legal Considerations. In addition to boundary lines, rights-of-way, and setbacks on the plan, a person should make notations concerning deed restrictions, easements, and building and zoning regulations. Some possible restrictions may exist in relation to obstructing views, the planting of certain undesirable trees, fence dimensions and locations, and out-building construction.

F. Off-site factors. The analysis of off-site conditions means considering the site as affected by distant views and neighboring areas.

1. A person will want to take advantage of any existing favorable views such as mountains, valleys, bodies of water, forests, and cities.
2. Neighboring properties have a great influence on the needs of the landscape site.
   a. A beautiful mature tree may be outside the area being landscaped, but it is a part of the landscape picture.
   b. When a neighbor has a pleasant-looking backyard, or some such feature, the view of this area should be accented.
   c. It may be necessary to screen distracting features from the landscape. Some possible problems include: noise, dust, bright lights, pedestrian traffic across the property, and unfavorable views caused by utility lines, billboards, roads, schools, factories, junkyards, and/or unkept areas.

V. Analysis of Family Needs

A. The family is perhaps the most important consideration in planning home improvements. An analysis of family needs will show the elements necessary to make a livable, useful, and attractive home setting.

1. In a family with small children it may be desirable to locate their play equipment so the children can be supervised from the kitchen. If the family likes lawn games, it will be desirable to leave an open area for these games.
2. A person may want to develop the total plan to encourage such hobbies as bird watching or growing specimen flowers for arrangements and competition.
3. If gardening is a family hobby, a person may construct a greenhouse for growing during the winter or a coldframe to start seedlings early in the spring. If a person has little interest in gardening and yard work, it will be necessary to develop a minimum maintenance plan.
4. The frequency with which a family entertains should also be given special consideration. A socially active family should give consideration to parking needs. In rural areas it may be advisable to set aside a special area for guest parking so that cars will not block traffic in the driveway. If a family plans to entertain outside during warm weather, then space must be provided. If the main interest is outdoor entertaining, then the terrace or patio should be large enough to accomodate a large group. A smaller paved area will be adequate just for the family.
5. If it is important to provide protection from insects at night, consideration should be given to some kind of screening for the terrace or patio.
6. In a case where it is desired to grow vegetables, a garden for this should be provided near the service area. A garden in which to grow cut flowers is difficult to incorporate into the landscape plan. It is recommended that the garden for cut flowers be located near the service area where the plants can be grown in rows especially for

cutting.

7. Homeowners and gardeners today have a wide array of tools and equipment. If the basement or utility area in the garage is too small to store this equipment, a person may want to consider building a storage shelter.
8. If future plans call for the installation of a swimming pool (preferably a sunken pool, as it is difficult to successfully integrate a raised swimming pool with the landscape of most small properties), this should be kept in mind while developing the basic plan. There is little need for setting out expensive shrubbery that must soon be torn up for a pool, house extension, or other major alteration. Naturally, it is impossible to foresee all such possibilities, but some such consideration should be given at the beginning.

B. The analysis of family needs is not complete without an inventory of liabilities.
   1. One possible liability could be the orientation of the house and lot. A house built on a high elevation may need barrier plantings, fences or windbreaks to modify the winds.
   2. The topography of the land can be an asset or liability. Grade changes offer many opportunities to create an interesting design.
      a. An extremely steep slope, however, can be considered a liability because of the tendency to erode under the force of heavy rains. In such a case it becomes necessary to establish a heavy ground cover for protection or to construct terraces and retaining walls to get additional level areas and control erosion.
      b. Completely flat land can also cause problems because of the lack of surface drainage.
   3. The soil will need to be investigated in respect to its acidity or alkalinity, texture, organic matter content, and drainage. Ex-

tremely acid or alkaline soils restrict plant growth. A heavy clay soil will hold an excess amount of water thus keeping the air from plant roots. For the best plant growth with easy maintenance, it is best to choose plants that are tolerant of the particular soil condition.

4. An unsightly view on the property or neighing property calls for a planting to "screen it out."
5. The height of surrounding houses and land should also be given careful consideration. Skillful arrangement of trees and shrubs, or fencing can screen such areas and, at the same time, create an attractive scene on the property.
6. If the property contains an excess number of trees, some may need to be removed in order that the remaining specimens will develop their most beautiful form.
7. Family checklist*
   a. Families might like to check off those items that apply to their needs and landscape. The family should look over the list, make their checks and then discuss the problems together. By using the checklist in this way the family should be able to consolidate and combine their ideas about the landscape they share.
   b. Although these are by no means the only questions that will occur, their answers will put the homeowner on his way toward planning a landscape that will do everything one can expect it to.
      1) Is off-street parking needed for guests and extra cars, or can they park on the street?
      2) Is the entry clearly defined from the street so guests can easily see the house number by day and night? Can guests see clearly where to leave their cars and how to get to the front door?

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*SOURCE: Reader's Digest Practical Guide to Home Landscaping

3) Is extra outdoor lighting needed to mark the way from the cars to the house? If so, it's best to have the wiring installed before the lawn goes in.
4) Will the walkway comfortably accommodate two people walking side by side? At least five feet width should be allowed and more is often good for long walks to keep them in relative scale.
5) Are there plants to make the entryway more interesting with plantings or, perhaps, enhance it with hanging baskets, potted or tubbed accent plants or a piece of natural or manmade sculpture?
6) Should the house be somewhat screened from view with plantings on the street side? If so, this would call for the careful location of trees (on the sight lines) and probably an underplanting of shrubs.
7) Could tall trees be used on the south side to cast shade on the house and help to keep it cool?
8) If a lawn is desired, is there a good, open space in full sun for it? If not, it may be better to settle for other ground covers.
9) Is there enough space to walk or to push a wheelbarrow completely around the house? This is a definite advantage in day-to-day maintenance.
10) Is the soil good enough to give the plantings the best chance for strong performance? If is has to be improved, rototilling should be done. This is an unsightly job, but the sooner it is done in the process of developing a garden, the better.
11) Is the terrace area large enough for the kind of outdoors living and entertaining planned? Be sure there is space allowed for the largest gathering. Check the space required for furniture.

12) Could more than one space be used for dining outside? Perhaps a picnic spot could be created well away from the house. Plantings can be used for screening.

13) Are there plans to cook out-of-doors and, if so, how complete a facility is needed? This can range from a small space for a portable charcoal broiler (which provides optimum flexibility), a large space for a built-in cooker with gas or electricity, or a complete weatherproof kitchen with refrigerator, sink, and range.

14) Is a place wanted for quiet lounging or reading, apart from the main terrace? Should it be in the sun or in the shade? Is there a place where relative privacy can be found without too much extra planting or building?

15) Would it be helpful to have built-in seating? Perhaps this could be in conjunction with a wall or raised bed. It's always there when you might want it, even when the portable furniture is put away for the winter.

16) Is a good place available for storing outdoor furniture during the off-season? If not, consider using folding pieces and building a narrow "storage wall" to put them in. This might be added to an existing fence or the side of a building.

17) Has consideration been given the outdoor space required for such necessities as garbage cans, clotheslines, storage of heavy equipment and garden tools?

18) Is more privacy screening needed? If so, decide what devices to use, whether plants, fences, walls, or panel screens.

19) Will there be young children in the garden? Has adequate room been planned for their play or for the

changing needs of space and equipment as they grow older?

20) Is anyone in the family a gardner? Is space needed for a cutting garden or vegetable garden and for a compost pile? These are all best screened from view.

21) Might there be heavy construction later on for a swimming pool or large paved area? If so, plan at the beginning to provide access for trucks and other machinery.

VI. Planning the Landscape Areas

A. The site to be landscaped is usually divided into three sections, each with a different use.

B. All areas must be planned to blend together well.
   1. The public area serves primarily as a setting for the house and should provide a year-round natural and pleasing appearance. It consists of the front lawn, driveway, walks, fences.
      a. The interior of a home is seen only by a select group of people, but the public area is seen by all who pass by the house or approach it. With this in mind it would be safe to assume that the first impression that is formed by a guest is determined by the public area.
      b. The main focal point (or accent) in the public area is the front entrance. Any vertical line in the public area is considered an accent, and unless properly landscaped will compete with the main entrance for attention. The front corners of the house show strong vertical lines and, therefore, are in great need of plants to soften these strong architectural lines.
      c. Before choosing the specific plants or their arrangement it is necessary to carefully analyze all the architectural lines of the house (including window locations, porch arrangement,

doorway, cornice detailing, and the like). Determine if these elements are pleasing and tastefully blending into an attractive overall design. If there are elements that seem awkward or for some reason do not fit, it will be necessary to arrange plantings to soften or make this component so that it will not dominate the total picture.

d. Study the balance of the structure.
   1) If the window arrangement is exactly the same on each side of the door, and the door is exactly in the center, it is balanced, or symmetrical. If this is not the case, it is unbalanced, or asymmetrical. In such a case, plants can be arranged to provide visual balance.
   2) Make a rough sketch to scale of the front of the house with windows, doors, porches, corners and other strong architectural features properly located. A black and white photograph of the front of the house is also satisfactory.
   3) Keep in mind that a customary objective in landscaping the public area is to accent the doorway in such a way that the viewer's eye will be brought to this point.
      a) On the sketch, make points at these places: bottom center of the door, 2/3 of the distance up at the left corner of the house, and 2/3 of the distance up at the right corner of the house.
      b) Draw lines connecting the dots on the corners with the dot at the door.
      c) Plantings that do not extend above these lines will form a "V" pattern and draw the eye to the front door.

e. In planning the public area, consider the views to the outside from rooms overlooking this area. Decide where plantings will be needed to frame a good view or screen a bad one, or where plantings will be needed for privacy.

f. The size of the house should determine the size of the public area. A large house needs a large lawn; a small house, a small lawn.

g. An open lawn is most effective as a setting for the house since it offers an unobstructed view of the house.

h. Background trees (trees planted in back of the house) will give the appearance of the house nesting in the foliage and soften the silhouette of the house against the sky.

i. Trees may be used in the public area to frame the house. Some properties may require several trees for enlargement, while others may require none. A large house needs a large frame. For a low ranch type house use small to medium size deciduous trees up to 35 feet high. Large trees can be used in the rear as a background.

j. To locate trees for framing the house first determine the point from which most people will see the house. This point will determine the size and placement of trees in the public area. Usually the driveway approach is the point. The trees closest to the point should be smaller trees while the ones placed farther away can be larger trees.

k. A well-designed plan for the public area will include accent plants to draw attention to the important parts of the home, such as the front entrance. They are also used to draw attention away from unsightly parts of the house, modify unpleasant proportions in buildings, soften harsh corners, and blend the house with the surroundings.

    1) Plants at the entrance should not be taller than 1/4 to 1/3 of the distance from the ground to the eaves (considering mature size).

Plants at the corners should be no taller than 2/3 the distance from the ground to the eaves.

l. If the house is a tall, narrow house it can be made to appear lower and wider by extending the foundation plantings to add wings to the building.

m. In most cases, do not cover a picture window with shrubs. Shrubs used under the window should not be higher than the window ledge.

n. A variety of plants may be used in the foundation. A combination of broadleaf evergreens, needle-leaf evergreens, and deciduous plants provides for a variation of interest with seasonal changes. The shrubs should be planted far enough away from the building to permit air movement, also so the roof overhang of the building will not keep off needed moisture for the plant roots. It is well to use ground-cover plants between the shrubs and between the shrubs and the building.

o. Remember, large trees should not be placed directly under power lines. They will soon grow up into the wires which makes it necessary that they be cut back; thus not allowing them to attain the shape and size which nature intended.

p. Fences, walls, etc., may be placed along the property lines in the public area, however, by excluding these, a more spacious and open appearance is given to the area.

q. Abstain from using conical or pyramidal evergrees for a foundation planting. Upright, pointed evergreens emphasize the strong, vertical lines of the house.

r. Often, an attractive setting can be given a home by a broad, open lawn with trees and foundation plantings. This should be broken only by the needed walks and drives. Front lawns should not be cluttered with such things as bird-baths, circular (or some other shaped) flower beds, gazing balls, fish ponds or pools, rock gardens, etc. These gadgets spoil what should be an open, informal vista. Such things are best located in the private area.

s. Every property needs walks and driveways. Their purpose is for use. Generally, they do not contribute to the appearance; therefore they should be as inconspicuous as possible. Straight driveways are best. Easy, graceful curves can be justified if there is sufficient space and if there is a reason for the curve (a natural object such as a tree, grade of the land, etc.) Keep in mind the main purpose for a driveway or walk--to get someone somewhere. This should usually be accomplished by the shortest, most direct route possible. For a farm there should usually be one extrance driveway to a central court. From this court there can be individual access routes to such areas as the house, garage, fuel storage areas, barns, machinery sheds, parking areas, etc. Ten feet should be a minimum width for one car.

t. Put walks where people naturally tend to walk. Since more people travel by vehicles, the driveway should serve as the walkway as well as for cars. A walkway from the drive to the front door parallelling the front of the house will lead visitors from the car to the front door. The front walk should be wide enough to allow two people to walk side by side; at least four feet, but five feet is better.

u. Since the entrance is the main focal point in the public area, a person may choose to elaborate on the points mentioned previously and create an entry garden. The entry garden includes the entrance walk leading to the front door and the open space surrounding it.

    1) A tree placed within the entry garden provides vertical emphasis

or contrast as well as a roof for the entry garden. Use a vase-shaped tree such as white birch or crabapple for this purpose. Trees with a broad oval shape or trees that grow too tall are unattractive for this purpose.

2) The entry garden, like all other aspects of the landscape, is an expression of individual taste.

v. The design and planting of the entry garden should blend in well with the total landscape plan, the corner plantings especially. A corner planting usually should have a combination of plants rather than just one. This will consist of a taller plant with a grouping of lower plants.

2. The service area is a work area. The needs of the owner will determine how this area should be developed. Some things commonly included in this area are: garbage cans, clotheslines, equipment storage shed, play areas, cold-frame, compost bin, vegetable garden, and flower garden.
    - a. The play area should be located so it can easily be seen from the kitchen.
    - b. A large service area may be divided placing commonly used items such as garbage cans near the service entrance and other items used less often, such as vegetable and flower gardens, further away.
    - c. If there is fencing in the service area, provide wide gates for trucks making deliveries or pick-ups.
    - d. The service area is usually located back of the house convenient to the kitchen or back door as well as to other buildings.
    - e. It is wise to include the vegetable and compost pile in or near the service area.
    - f. The size of the service area should be as small as possible, yet large enough to be adequate.

   g. This area will need to be well-screened. This can be accomplished with plants, structures, or a combination of plants and structures.

3. The private area is an extension of the living and relaxation areas of the house.
   a. It is often located near the dining room, living room, or family room of the house.
   b. The area is used mainly for games, outdoor hobbies, parties, and relaxation.
   c. The patio (or terrace), lawn, and flower beds are all incorporated into this area. By virtue of its main function, it must include plants and/or structures for privacy. Enclosure and screening may not be as necessary in the country, where privacy is attained by distance.
      1) Locate the patio early in designing the area, then plan the remainder of the area to take advantage of this location. Because the patio is the connecting link between the house and private area, it should be located conveniently for both areas.
      2) The use of screens, fences, canopies, trees, and shrubs, may be needed to provide shade, privacy and protection.
      3) A good general guide for the size is twice the size of the average family room, but this can be altered to fit the family's needs.
      4) Generally speaking, the patio is in the rear of the house but this is not mandatory. However, any other location may call for more attention to providing privacy.
      5) The shape of the patio depends on the overall garden plan. A person should not feel bound to a square or rectangular patio. There is no limit to the possi-

bilities as far as shape is concerned. Curving surfaces are graceful and effective. Before deciding on the definite shape, draw rough sketches to be sure it is pleasing in all aspects. Then a person can decide if an unorthodox shape is suitable or whether a simple layout is best.

6) Just as there are numerous possibilities as far as the shape of the patio there are many suitable materials for paving. Choose carefully to be sure the paving material is in character with the overall plan. It should be durable, easily cleaned, and comfortable to walk on as well as economical. Some materials can be applied by the home-owner while others require professional installations.

   a) Concrete is low-cost, permanent, and easily cleaned. One main disadvantage is the monotonous appearance in large areas. These areas can be divided into modular sections with wooden dividers to give the floor a pattern.

      Another possibility is what is called exposed aggregate. In this case small stones are embedded in the surface, resulting in a textured finish that is handsome and blends well with the surroundings.

   b) Tile (quarry tile) is smoother than brick and easily cleaned. Colors run from off-white to blue-green, with red hues the most popular. This surface is best installed by a craftsman.

   c) Brick is an extremely popular paving material for the patio. A hard-burned brick is usually the most satisfactory. In regions where severe winters occur, specify SW (severe weathering) brick. They can be laid in a multitude of patterns (herringbone, basket-weave, running bond, etc.), and they can be installed by fitting bricks into redwood or cedar grid patterns. Brick can be installed on sand as follows:

- Grade the soil to allow for the thickness of the brick plus a 2-3 inch layer of sand.
- Smooth and tamp the soil down thoroughly, making sure there is a slight drainage away from the house.
- Put in a 2-3 inch layer of sand.
- Set the bricks as closely together as possible, checking each row with a level.
- Dust sand into the cracks.
- Wet down with a hose and brush additional sand into the cracks.
- Repeat until all cracks are filled.
- Edgings mustbe provided with wooden strips held firmly in place with stakes, or with a border of bricks set in concrete.

d) If a wood floor is desired, one of the main concerns should be that lumber of good quality is used. Redwood is excellent but expensive. Other wood treated with preservatives will last many years. On a hillside site a wooden deck is logical, handsome and pleasing in the landscape.

e) Patio blocks are available (or can be made) in a variety of shapes (square, rectangular, hexagon, round, and random) and colors. They are installed on a sand base. The surface can be a smooth or exposed aggregate finish.

f) Wood blocks and rounds are attractive and especially pleasing in a woodland setting. The rounds can be cut from redwood, cedar, or cypress. They should be 4 inches thick and installed on a sand base.

Railroad ties are a good source of blocks. They also should be laid on sand. Sand or gravel can be used to fill in between the blocks or rounds. When the components decay they will be very easy to replace.

- g) Loose-fill material can be attractive but is usually considered to be only temporary. Some possibilities include: wood chips, crushed brick, gravel and marble chips. Installation includes digging out 6-8 inches of soil. Cover the area with heavy polyethylene to help keep out weeds. Pour 2-3 inches of fine gravel, then cover with the desired material and level. Edging strips should be used to confine the material.
- h) Indoor-outdoor carpeting is coming into use as a patio surface. It requires a wood or concrete subfloor and is quite expensive.
- i) Slate is another possible paving material. It has an elegant appearance and is long-lasting but expensive.
- j) Fieldstone. It is difficult to find stones with surfaces that are flat and smooth. Patience is required in fitting fieldstones together properly.
- k) Flagstone gives an interesting effect. It can be installed on a sand base or on concrete.

7) In deciding on the planting for a patio, one of the first considerations should be given to the selection of a suitable tree, Since shade will be needed, a tree is a likely source. A planting pocket can be left in the patio surface for a shade tree.

- a) Consider a red maple, improved honey locust,or yellowwood tree, if the need is for a large tree.

NOTE: A more complete listing is available from the Cooperative Extension Service.

b) If a smaller tree will do, perhaps with double or multiple trunks, use a dogwood, magnolia, birch or fringetree.

c) Evergreens will also add to the appearance and usefulness of the patio area. A Scotch pine or white pine may serve as a windbreak. A low hedge of holly or taxus will be neat and attractive. An espaliered pyracantha or euonymus will be attractive against the house wall.

d) Color for the patio can be provided with blooming potted plants. Geraniums, begonias, impatiens, caladiums, petunias and many more provide all-summer color.

4. The private area is a combination of many things of which the patio is only one part. Thus the entire area must be unified.
5. The one other division, besides the patio, is the lawn area.
   a. This will have a variety of uses; relaxation, beauty, entertainment, recreation, etc.
   b. Generally, the plantings are kept to the sides with the center open, except for an occasional tree.
   c. For the border of the lawn area, use several plants of a few varieties for best appearance. Taller plants should be used in corners and as background plants. One generally accepted rule is that everything should be wider than it is tall.
   d. Flowering shrubs are more effective if used in groups and located several places in the area. They do not have to have the same arrangement or number; perhaps these could be used in one location and five or seven in another.
   e. Different groups of shrubs should be of different heights - tall shrubs with

shrubs of medium height, low shrubs underplanted with ground cover plants. Small trees can also be worked into the border planting.

6. Any desirable off-property view should be incorporated into the landscape. Such views can be the focus of the area in the yard. Care should be taken to avoid obstructing this view.
7. The private area can become the "home" of attention-getters such as a bird bath, gazing ball, and other objects inappropriate for the public area. Keep in mind that too many such objects give a cluttered effect. Where such an object is used create a setting for it and use it as a focal point.
8. Recreation is an important function of the private area.
    - a. Areas such as a basketball court will not add to the appearance, but if such a sport is important to the family it may be provided. It may be possible for the driveway to be used as an area for basketball, etc.
    - b. If there is space for a regulation-size area for the various sports, use it. If not, most everyone can have just as much fun on a court of "unofficial" size. Surfaces, for many sports, do not have to be regulation.
    - c. The grass lawn is adequate for such games as badminton, croquet, volleyball, etc. Some dimensions are as follows:
        - 1) Volleyball - 30' x 60'
        - 2) Tetherball - Circle with a radius of 10'
        - 3) Horseshoes - 6' x 40'
        - 4) Basketball - 37' x 42' for a half-court
        - 5) Deck Tennis - 22' x 48'
        - 6) Tennis - 48' x 108'
        - 7) Croquet - 38' x 85'
        - 8) Shuffleboard - 6' x 52' (requires a smooth, hard surface)
        - 9) Badminton - 20' x 44'

VII. Basic Guidelines for Landscaping

A. In planning a workable and attractive landscape plan, a person should consider developing a plan that requires minimum maintenance. Except for the really enthusiastic gardener, jobs such as weeding, watering and pruning are a chore and to a great extent can be reduced and perhaps eliminated by good planning. Most plantings need more attention the first few years for watering and weeding. Some labor resources are:

1. The installation of mowing strips along walls, flower beds, shrub groupings and trees will save hand clipping the grass around these edges. A mowing strip is simply a strip, about a foot wide or so, around the mentioned areas paved with cement, brick, flagstone or gravel. In addition to saving time they give the entire area a neat, attractive appearance.
2. The extensive use of mulches can be a great assistance in weed control and maintenance of soil moisture.
    a. The weeds that penetrate a mulch are easier to pull than in unmulched areas.
    b. In addition, mulches are attractive and provide a neat, finished appearance to the planting.
    c. Two to three inches of a mulch will be needed to be effective.
    d. Some excellent mulching materials include: well-rotted sawdust, shredded pine bark, tanbark, wood chips, pine needles, leaf mold, very coarse peat moss (the grade used for poultry bedding), ground corn cobs, and homemade compost.
        1) Materials such as sawdust, ground corn cobs, and wood chips can rob the soil of nitrogen as they decay, thus starving the plants in the vicinity.
        2) The addition of a commercial fertilizer high in nitrogen is recommended several times during the year to replenish the nitrogen.
3. The use of ground-cover plants in any areas where it is difficult to establish or maintain a good stand of grass will greatly reduce maintenance and add to the appearance.

- a. Areas where ground-cover plants should be used include:
    - 1) Steep banks that are difficult to mow
    - 2) Between shrubs and along foundation walls
    - 3) Under trees that cast a dense shade making it virtually impossible to maintain a thick stand of grass
    - 4) Under trees (such as maples) which root close to the surface of the ground, thus reducing the thickness of the grass by robbing it of valuable moisture and nutrition.
- b. Some excellent ground cover plants are: English ivy, vinca minor, Japanese spurge (or pachysandra), bugle weed (Ajuga reptans), and Evonymus Acutus.

4. Thanks to the very fine efforts of plant breeders, dwarf varieties of most of the popular landscaping plants have been developed. Although more expensive initially, they grow more slowly and at maturity do not get as large as the standard variety. This will cut down the pruning required. Any plant is more attractive if it can be allowed to attain the shape and size which nature intended; this can be accomplished with a minimum of pruning with dwarf varieties.

B. The proper spacing of plants is determined by their mature size.

1. Large shade trees should be placed at least 40 ft. apart, preferably, 50 to 60 ft.
2. Trees planted to frame a house should be placed 15 to 75 feet from the structure, depending on the size of the lawn, type of house, and desired effect.
3. Space trees close together for a windbreak.
    - a. Evergreens will serve well for this purpose.
    - b. A double row of trees will do an even better job. Place the trees 6 ft. apart in rows spaced 8 ft. from center to center.
4. Where vines are to be grown on a wall, they

should be placed as close to the wall as possible. Small vines should be spaced 10 feet apart; larger growing vines 15 feet or more apart.

5. Shrubs four to five feet high should generally be placed two feet from a wall, four feet apart and three feet from a drive, walk or lawn edge.
6. Shrubs six to eight feet high should usually be placed three feet from a wall, five feet apart and four feet from a drive, walk, or lawn edge.
7. Shrubs 8 to 15 ft. tall will need to be spaced 4 feet from a wall, 6 ft. apart and 5 ft. from a drive, walk, or lawn edge.
8. Small trees from 15 to 30 feet high can be spaced at various intervals, depending on the desired effect.
    a. Generally they should be 6 to 8 feet from a wall but can be closer if necessary. Usually the spacing between such trees should be at least 10 feet.
    b. If planted close to a walk or driveway, the lower branches may need to be cut off for clearance.
9. Plants to be used as a hedge will need fairly close spacing. Small plants can be set 12-18 inches apart; medium plants may be spaced 2 feet apart and tall plants up to 3 feet apart.

C. In planning any project, the item of cost is not to be overlooked. A person should keep in mind that a good landscaping plan will immediately add 10% to the value of the home. As the plants mature, this figure may well increase considerably.

1. The general appearance and usefulness of the area will be greatly enhanced by a good design.
2. The costs will vary from site to site depending upon the design, plants used, labor costs, etc.
    a. Keep in mind that the entire plan does not have to be completed in one operation;
    b. Costs can be spread out over a 3 year, or even a 5 year period to offset the initial cost.

1) The first year, install all paved areas, steps, walks, fences, trees and lawn.
2) The second year, establish the shrubs.
3) The third year, include the groundcover plants, bulbs and perennials.
4) Garden ornaments could be added later.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher.

1. Designing a landscape is an art, a science, and a variety of engineering techniques. To be really proficient requires years of study and training. This course can be of great benefit for those whose interests are in "amateur" landscaping; it can also do much to enrich the leisure time of those who are interested in gardening by working with care. Applied with common sense the ordinary person can master most situations. If impossible situations arise, the students may consider consulting a professional in landscape design.
2. One goal in the life of most people is to own the home in which they live. In addition it does not end with just owning the home but extends into the improvement of living patterns and the expression of the individual's creativity in making improvements.
3. A simple plan, well established and maintained, will give more satisfaction than a complex plan which cannot be well executed or maintained. This requires a realistic appraisal of available time for maintenance and available finances, as well as a knowledge of plant materials. Without a complete plan, the property may fast become an annoyance instead of a pleasure.
4. A good landscape plan should combine everything so it goes together well. The buildings must be combined with the major landscape

areas and with the people and their work in these areas.

B. Things to be brought out by students.
  1. Their knowledge of the practices used in landscape design.
  2. Experiences as to how well their home is now serving to meet the family needs.
  3. Ideas of improvements that are needed.

II. Conclusions

A. Design with something to look at:
  1. A pleasing view of the surrounding countryside, a body of water, woodlands, etc.
  2. Create a garden on your own in the absence of such a feature.

B. Plan for an adequate patio for outdoor living with walls, fence plants, etc. to provide seclusion, shade, protection from the wind, beauty, and usefulness.

C. Select trees for shade, evergreens for winter beauty, and flowering plants for summer color.

D. Use container plants, especially in the patio area.

E. All parts of the home grounds should be planned with maintenance requirements in mind. Strive for a natural appearance among all plants and structures used. For example, do not paint tree trunks or rocks which are used as a border for plants.

III. Enrichment Activities

A. Have each student prepare a site analysis plan and an analysis of family needs.

B. Have the students collect magazine and newspaper clippings as examples (preferably in color) of good designs for the public, private, and service areas.

C. Visit well-landscaped properties and draw an area layout plan (as it exists) for each; discuss possible alternative solutions for the development of the areas.

D. Make a slide collection of the front view of homes without landscaping; discuss possible landscape designs for these homes.

E. Have students collect clippings pertaining to landscape design.

F. Show examples of completed landscape plans.

G. Provide students the opportunity to study symbols used in landscape planning.

IV. Suggested Teaching Materials

A. References

1. Approved Practices in Beautifying the Home Grounds, pp. 73-79.
2. Betty Ajay's Guide to Home Landscaping, pp. 6-20.
3. Flower and Gardening, May, 1973, pp. 25-32.
4. Gardening and Home Landscaping, pp. 13-32.
5. How to Plan and Plant Your Property by Alice Recknagel Ireys, L. A., pp. 6-58.
6. Introductory Horticulture, pp. 377-380.
7. Landscape Bulletin 1: Landscape Design for Residential Property.
8. Landscape Design, A Teacher's Manual, The Pennsylvania State University, pp. 11-27, 30-61.
9. Landscape Design, Vocational Education Publications, California State Polytechnic College, pp. 11-16, 28-38.
10. Landscaping and The Small Garden, pp. 3-20.
11. Landscaping The Home and School Grounds, pp. 2-15.
12. Landscaping Your Home, Ohio State University, pp. 1-15, 27-61.
13. Landscaping Your Home, Wm. R. Nelson, Jr., pp. 11-28, 79-112.
14. Planning The Home Landscape, Kentucky Unit HS-81.

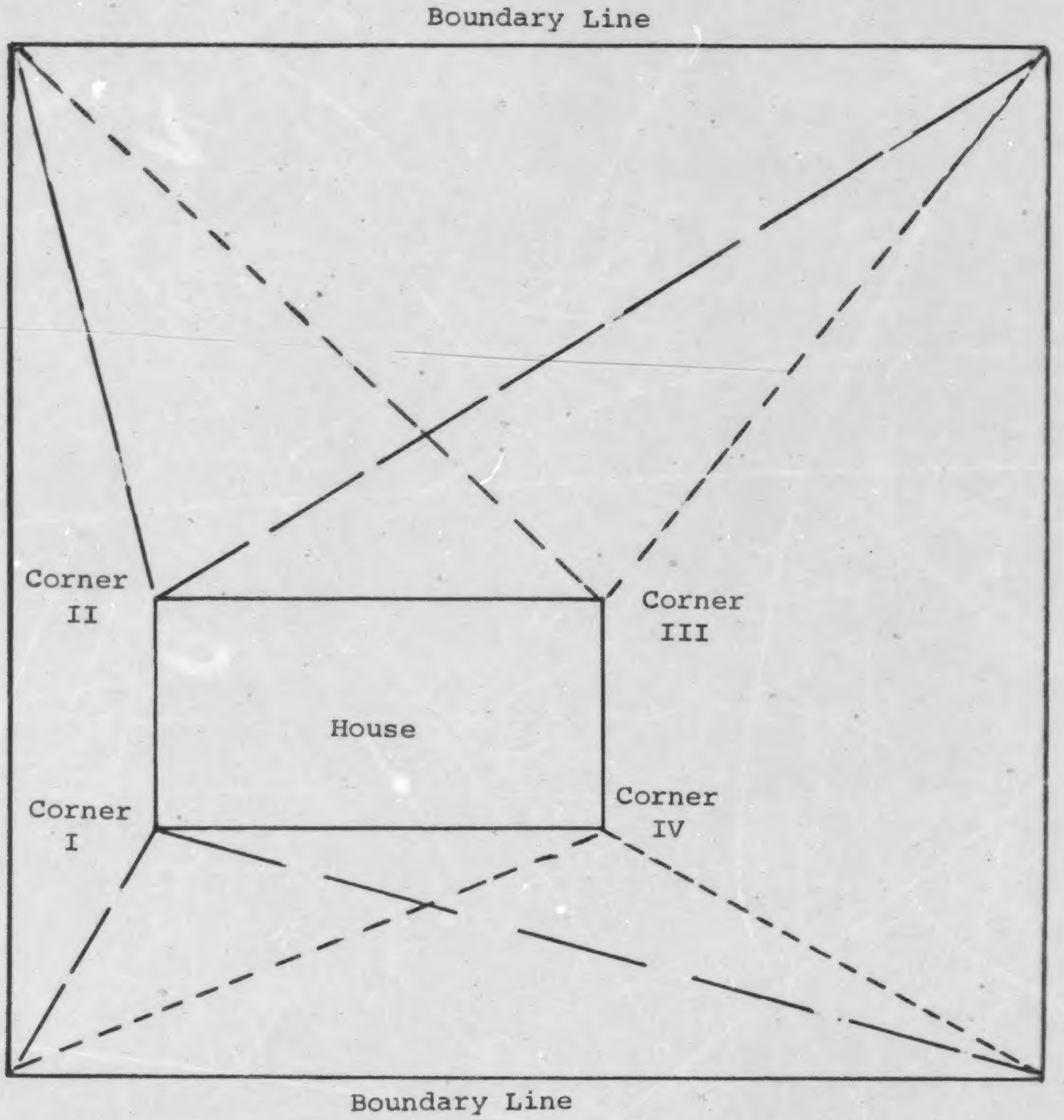
*15. Reader's Digest Practical Guide to Home Landscaping, pp. 166-176, 196-201, 301.

*Especially recommended for this lesson.

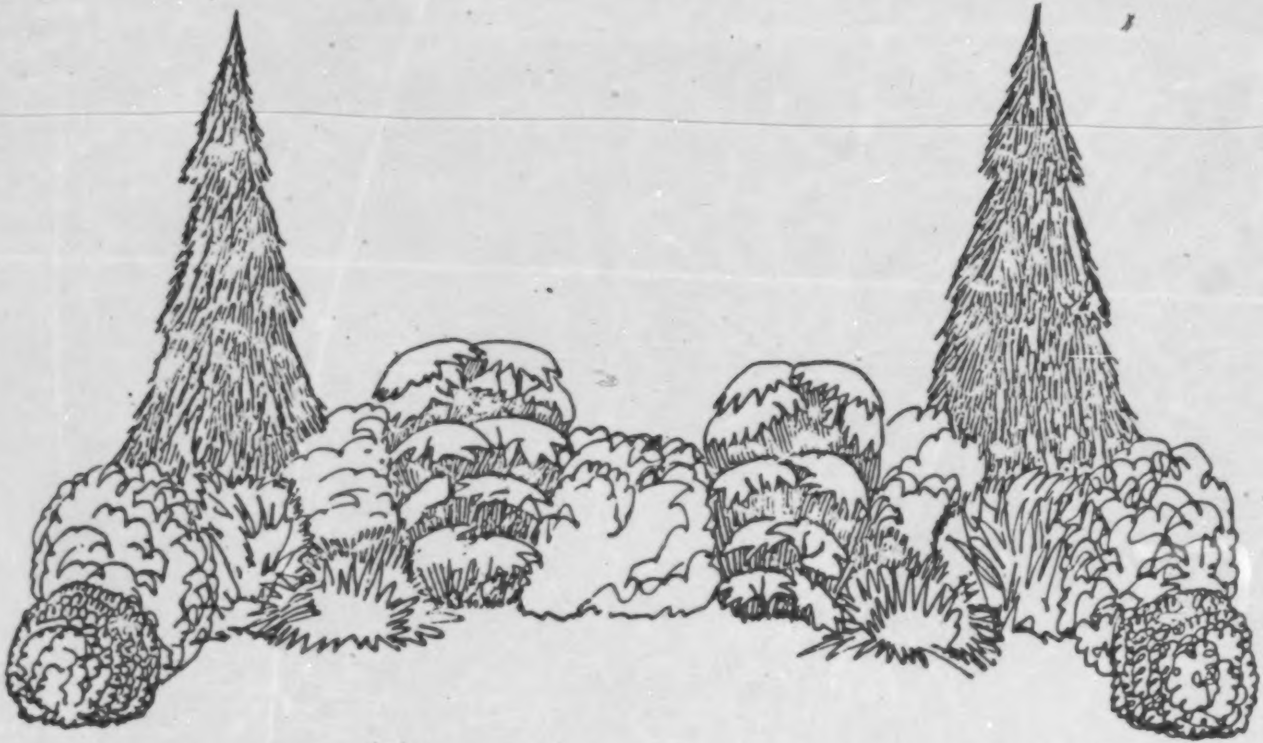
B. Resource Personnel
  1. Local nurserymen
  2. An art teacher (to discuss design in general)
  3. Garden editor from a newspaper
  4. Extension horticulture specialists
  5. For additional personnel, consult Vo Ag Directory of Resource People in Kentucky.

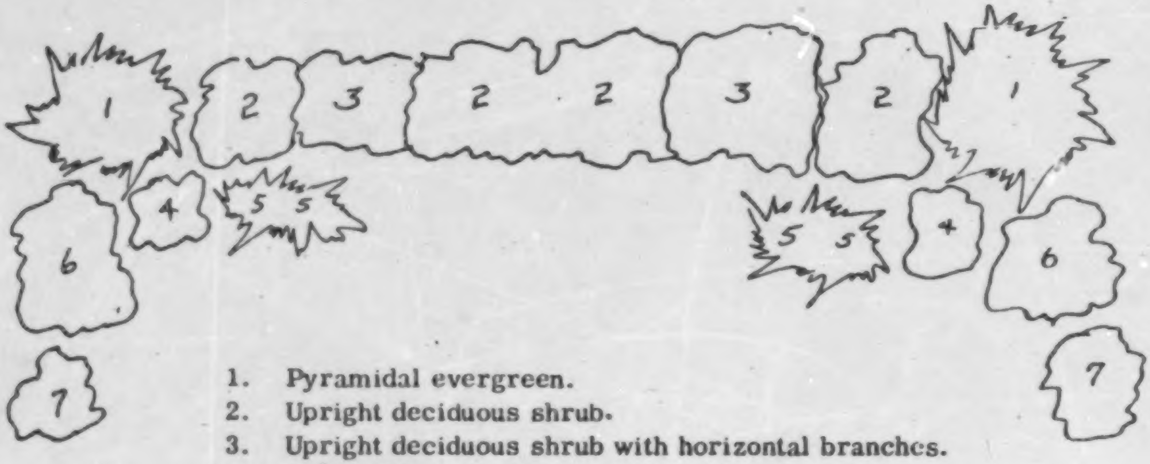
C. Audio-Visuals
  1. Masters
    -1 Locating the House on the Landscape Plan
    -2 Balance in Landscape Design - Symmetrical Plan
    -3 Balance in Landscape Design - Asymmetrical Plan
    -4 Informal Landscape Design
    -5 Provide for Adequate Drainage
    -6 Grading
    -7 Value of Enclosure
    -8 Major Lawn Areas
    -9 Major Farmstead Use Areas
    -10 Student Exercise
    -11 Service or Work Area Improvements
    -12 Landscape Symbols
    -13 Site Analysis Checklist

LOCATING THE HOUSE ON THE LANDSCAPE PLAN


Boundary Line
Corner II
Corner III
House
Corner I
Corner IV
Boundary Line

Balance in Landscape Design, Symmetrical Plan



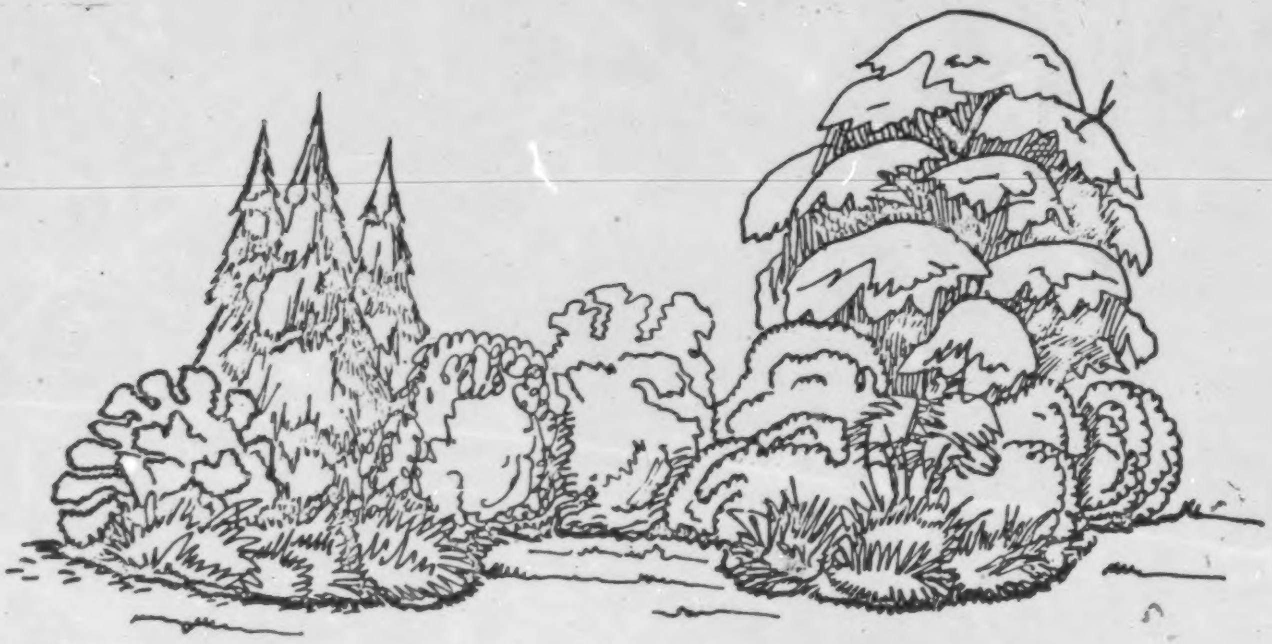


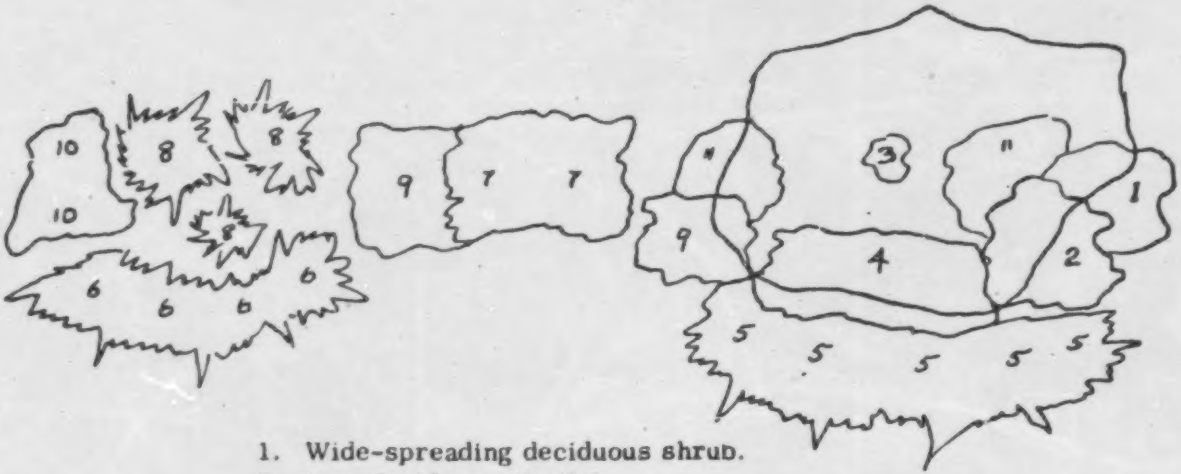
1. Pyramidal evergreen.
2. Upright deciduous shrub.
3. Upright deciduous shrub with horizontal branches.
4. Rounded broadleaf evergreen.
5. Prostrate evergreen.
6. Rounded deciduous shrub.
7. Low broadleaf evergreen

F 63

Source: Landscape Your Home, Ohio Agricultural Education Curriculum Materials Service, p. 4.

Balance in Landscape Design, Asymmetrical Plan





1. Wide-spreading deciduous shrub.
2. Low deciduous shrub.
3. Small deciduous tree.
4. Deciduous shrub, upright branches.
5. Prostrate evergreen.
6. Prostrate evergreen (different variety).
7. Tall deciduous shrub.
8. Pyramidal evergreen.
9. Rounded deciduous shrub.
10. Broadleaf evergreen.
11. Tall deciduous shrub, shade tolerant.

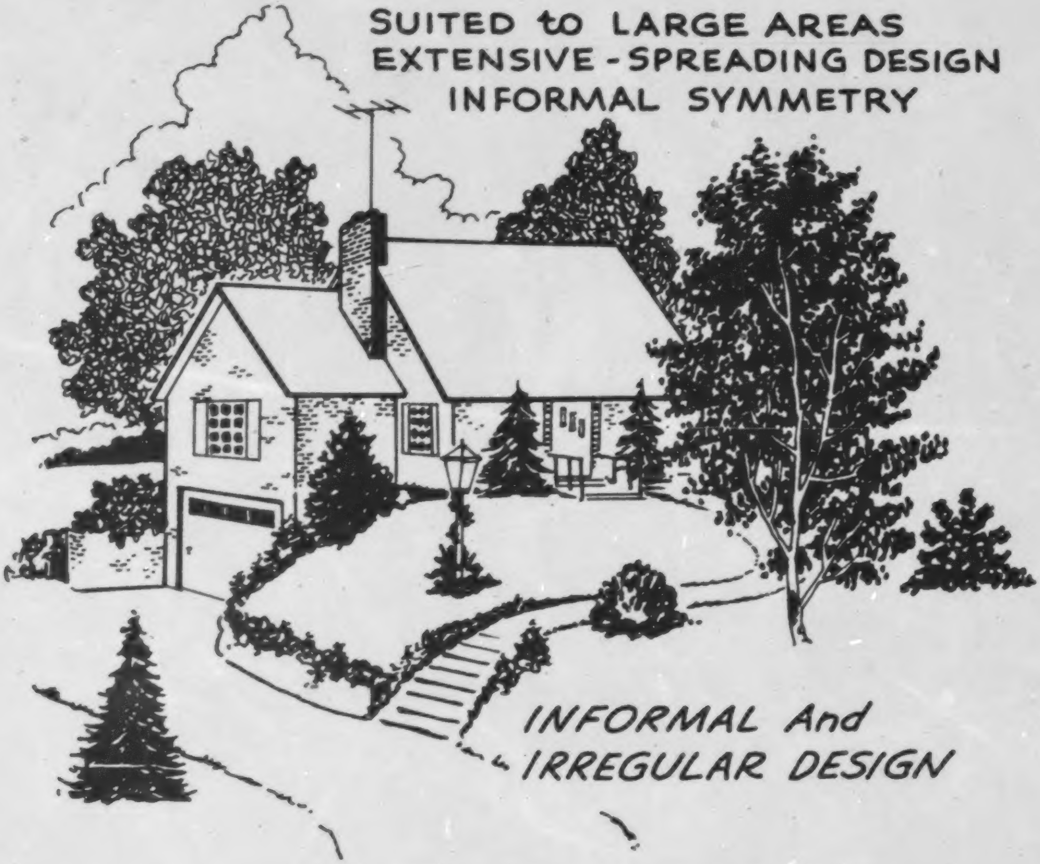
Source: Landscape Your Home, Ohio Agricultural Education Curriculum Materials Service, p. 6.

INFORMAL LANDSCAPE DESIGN

IRREGULAR ORDER

NO STRAIGHT LINES
NO REGULARITY
VARIETY ENCOURAGED

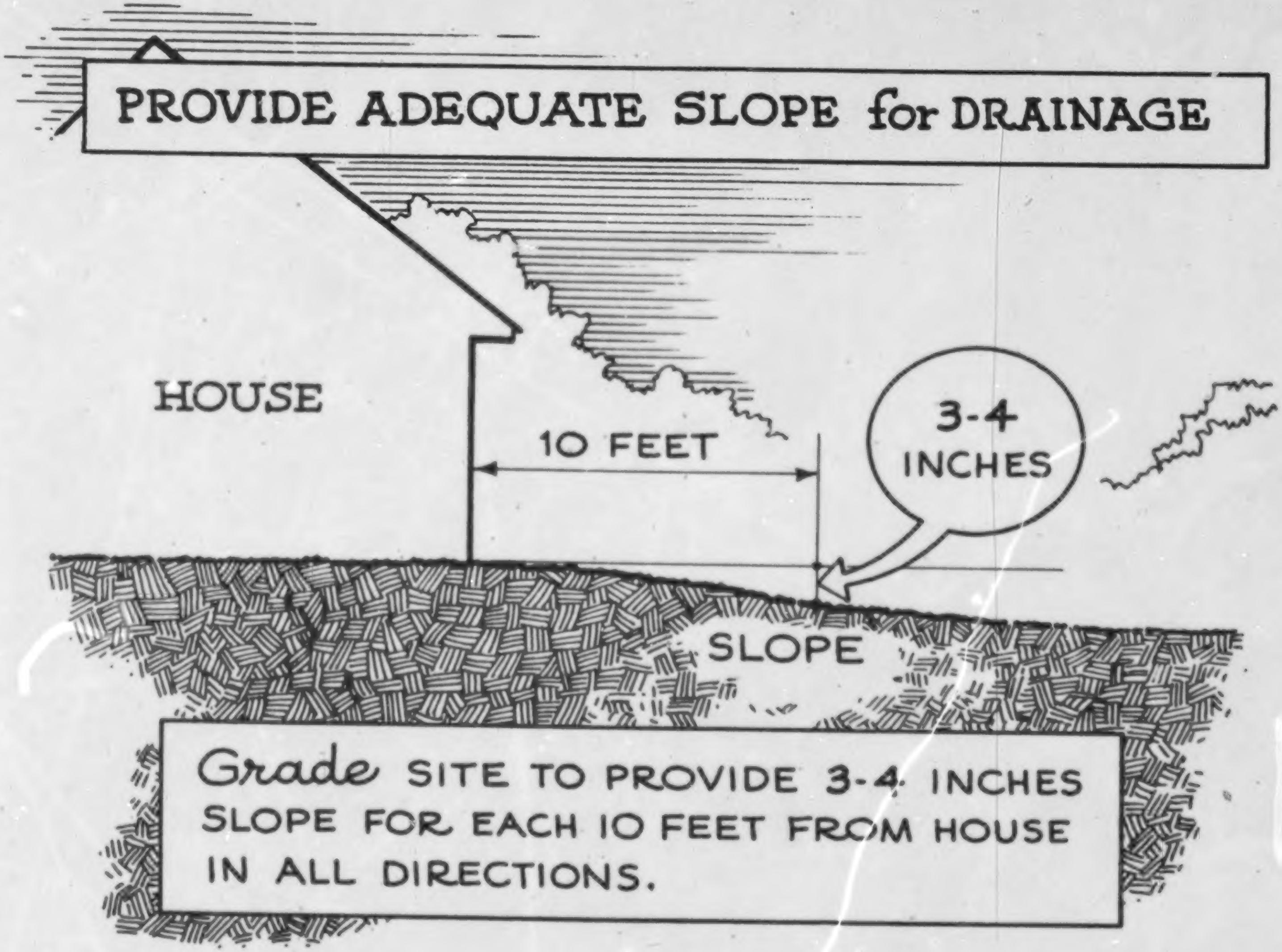
SUITED to LARGE AREAS
EXTENSIVE - SPREADING DESIGN
INFORMAL SYMMETRY



INFORMAL And IRREGULAR DESIGN

T. VANTREESE, INST. MATL. LAB., U.K.

PROVIDE ADEQUATE SLOPE for DRAINAGE

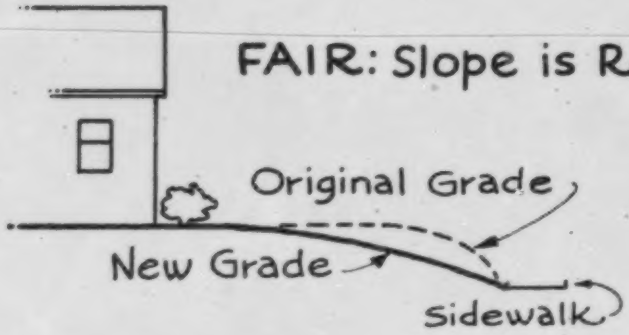

HOUSE
10 FEET
3-4 INCHES
SLOPE

Grade SITE TO PROVIDE 3-4 INCHES SLOPE FOR EACH 10 FEET FROM HOUSE IN ALL DIRECTIONS.

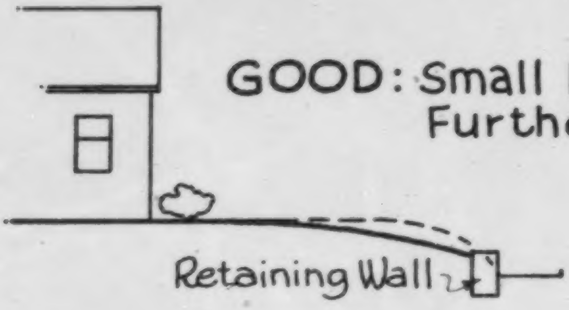
Adult 110-2-5

T.Vantreese, INST. MATL. LAB., U.K.

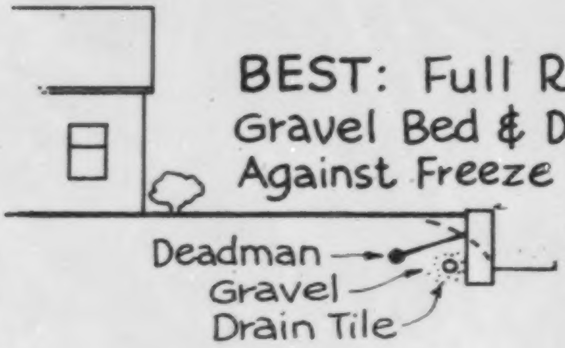
GRADING The LAWN


Original Grade
New Grade
Sidewalk

FAIR: Slope is Reduced


Retaining Wall

GOOD: Small Retaining Wall Further Reduces Slope

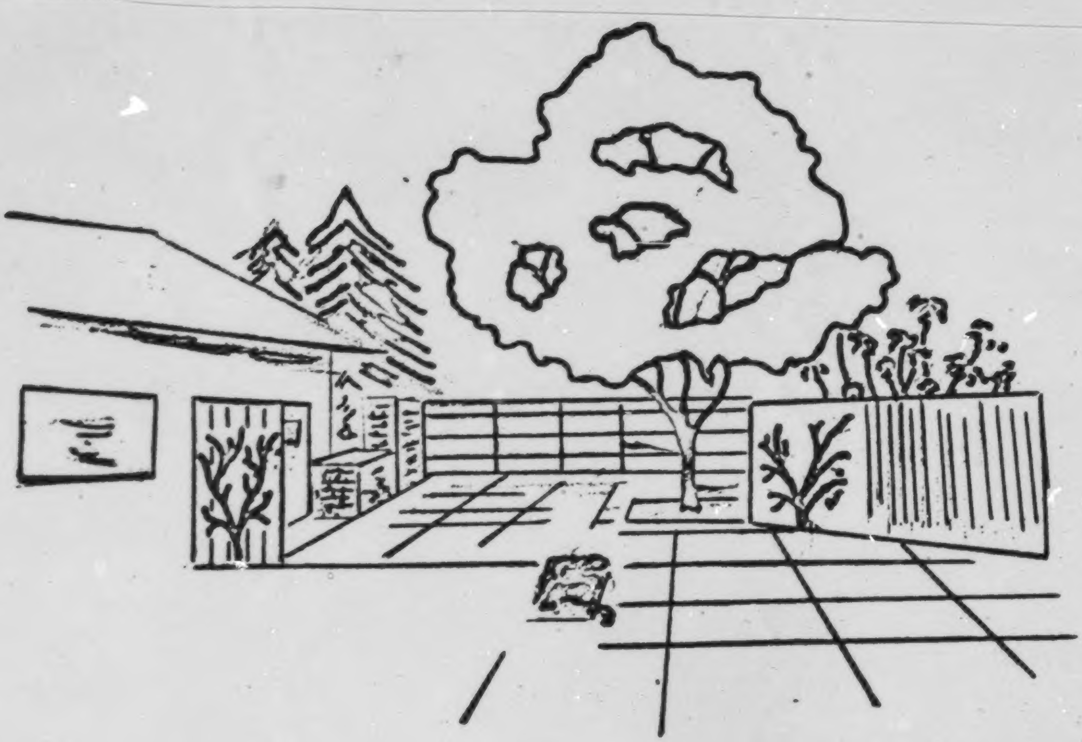

Deadman
Gravel
Drain Tile

BEST: Full Retaining Wall With Gravel Bed & Drain Tile to Guard Against Freeze Damage to Wall, and Anchored for Stability

TAKEN From PAGE 10, KENTUCKY CIRCULAR 618, "HOME LAWNS IN KENTUCKY"

T. VANTREESE, INST. MATL. LAB., U.K.

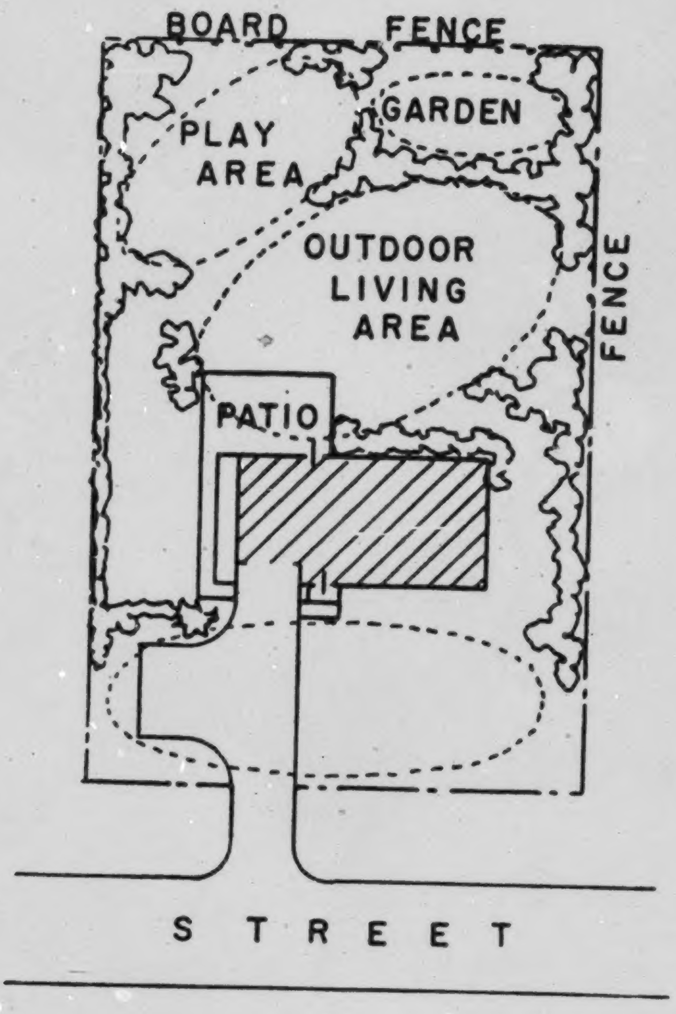
Value of Enclosure



Trees used for enclosure of a patio area often can be planted within the patio. A striking effect can be achieved if a tree with unusual bark characteristics or an attractive flowering habit is used in this manner. Locate the tree no closer than ten feet from the house. A distance of twenty feet is maximum.

Source: Ohio Agricultural Education Curriculum Materials Service.

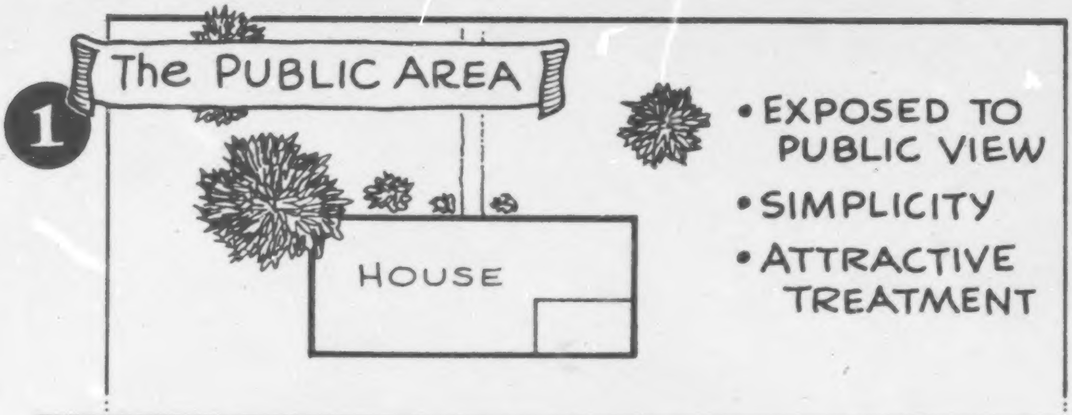
MAJOR LAWN AREAS


BOARD FENCE
GARDEN
PLAY AREA
OUTDOOR LIVING AREA
FENCE
PATIO
STREET

Source: Cornell (N.Y.) Extension Bulletin 1099.

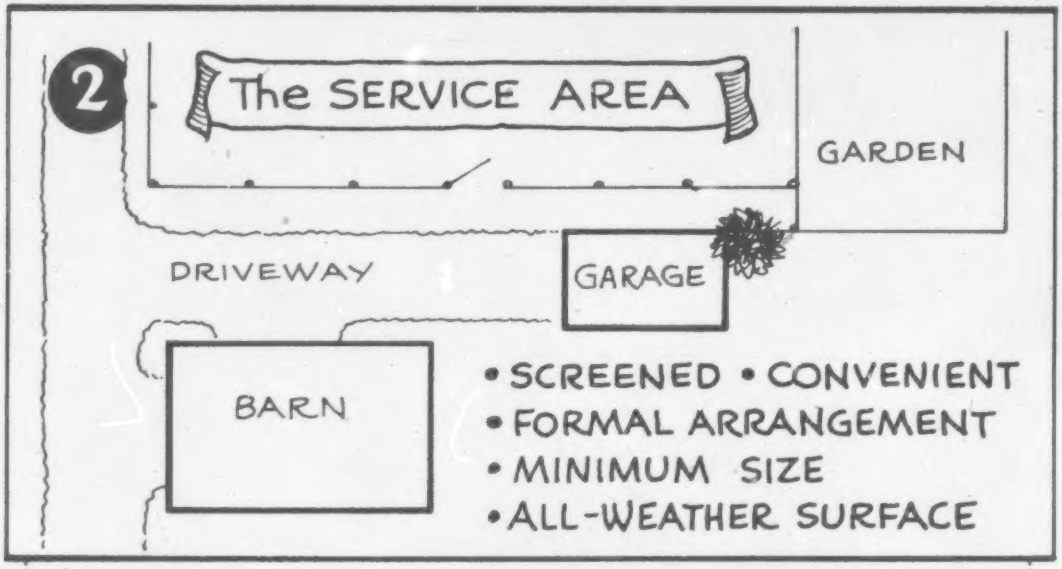
Adult 110-2-8

Major FARMSTEAD USE AREAS



1 The PUBLIC AREA

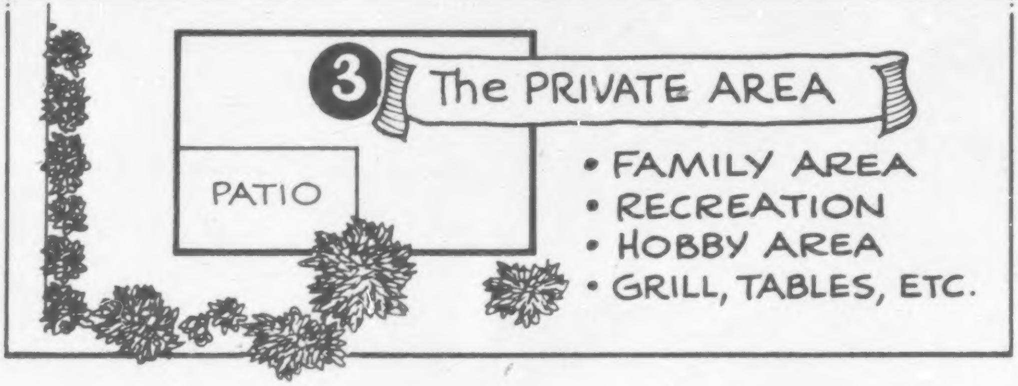
- EXPOSED TO PUBLIC VIEW
- SIMPLICITY
- ATTRACTIVE TREATMENT



2 The SERVICE AREA

GARDEN
DRIVEWAY
GARAGE
BARN

- SCREENED
- CONVENIENT
- FORMAL ARRANGEMENT
- MINIMUM SIZE
- ALL-WEATHER SURFACE



3 The PRIVATE AREA

- FAMILY AREA
- RECREATION
- HOBBY AREA
- GRILL, TABLES, ETC.

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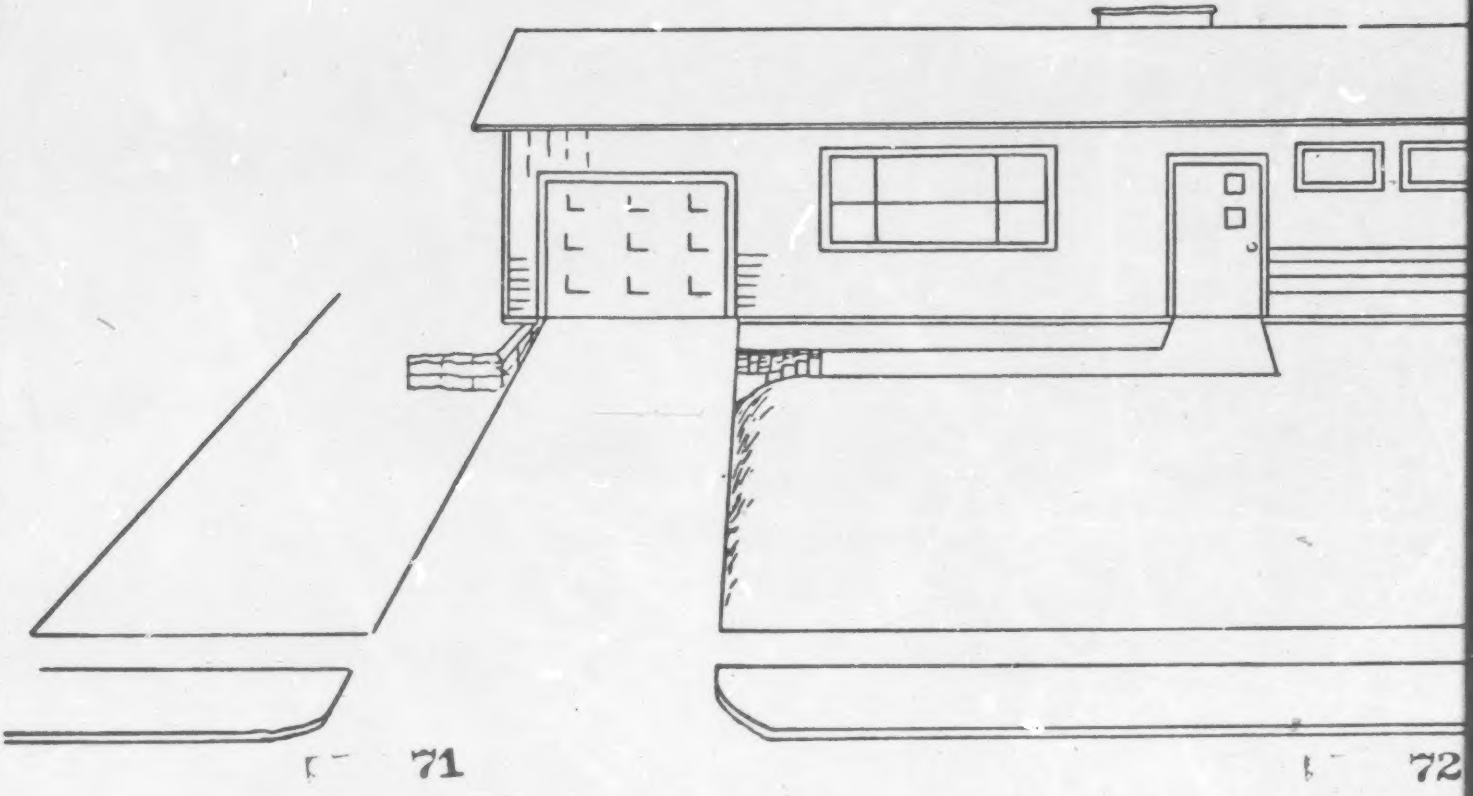
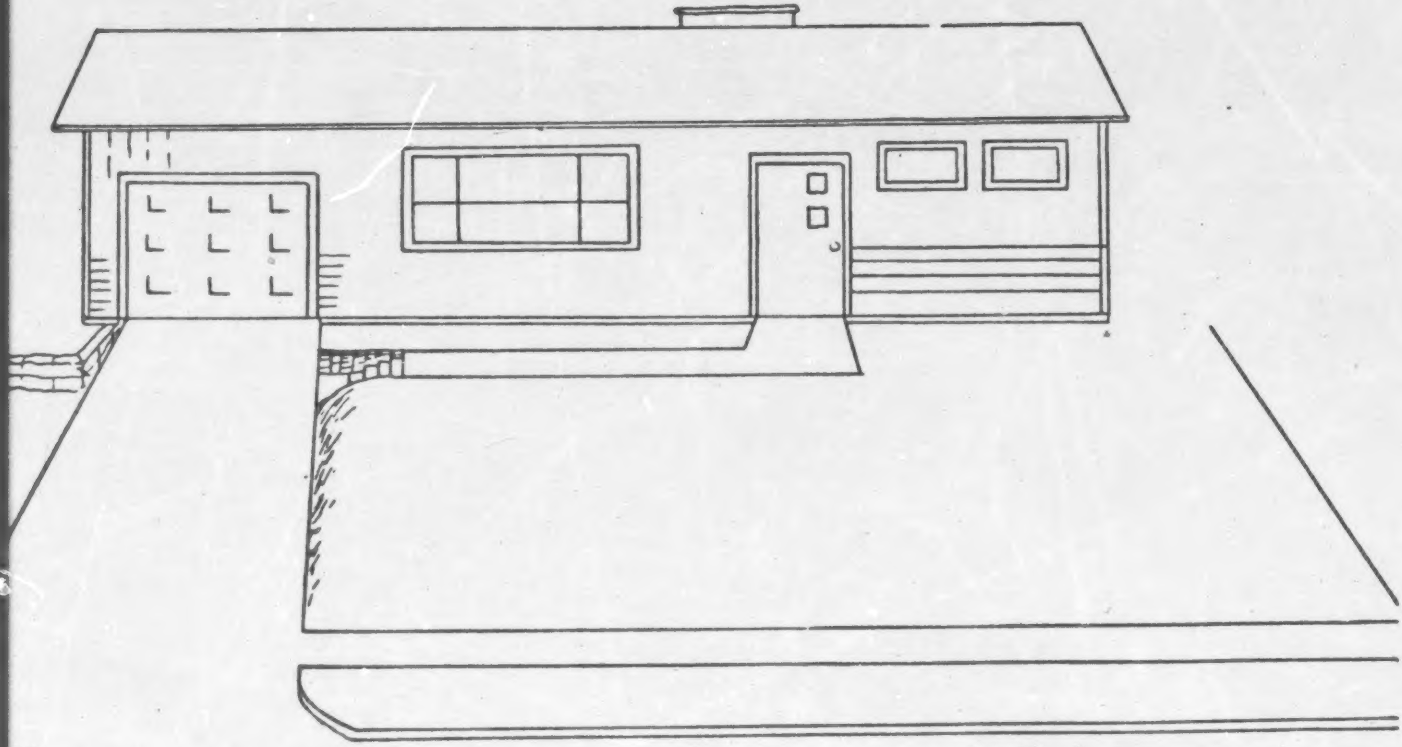
STUDENT EXERCISE



Exercise in landscape design for a modern ranch-type house.
(scale: 1 inch = approximately 10 feet)

Source: Landscape Your Home, Ohio Agricultural Education Curriculum Mate
Service, p. 53.

STUDENT EXERCISE



Exercise in landscape design for a modern ranch-type house.
(scale: 1 inch = approximately 10 feet)

scape Your Home, Ohio Agricultural Education Curriculum Materials
ice, p. 53.

SERVICE Or WORK AREA *Improvements*

BARNS
GARAGES
and Other OUT BUILDINGS

•paint •repair •remodel •wiring •etc.

PROPER SELECTION & IMPROVEMENT
- OF FACILITIES
- OF EQUIPMENT
- OF BUILDINGS

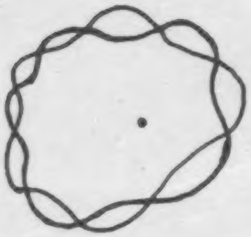
IN THE SERVICE AREA

WORK - SERVICE AREA

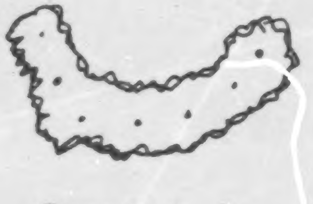
- NEAT
- FUNCTIONAL
- As ATTRACTIVE as POSSIBLE

T. VANTREESE, INST. MATL. LAB., U.K.

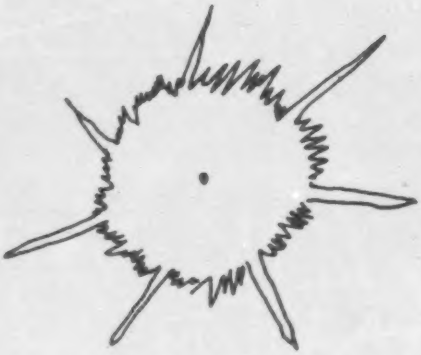
SYMBOLS TO USE IN DRAWING LANDSCAPE PLANS



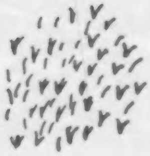
Deciduous tree
or shrub



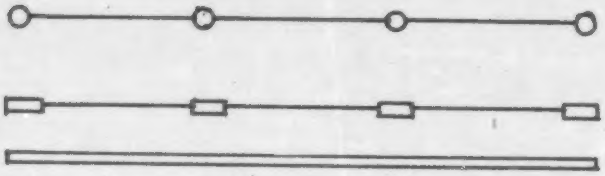
Group of
shrubs



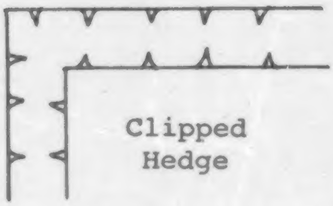
Evergreen tree
or shrub



Ground
Cover

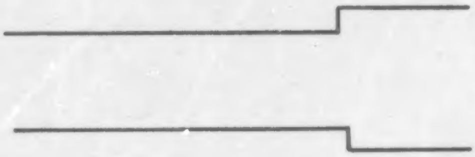


Fence

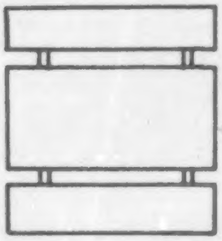


Clipped
Hedge

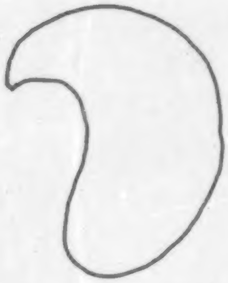
Bench



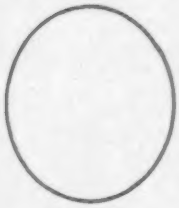
Walk



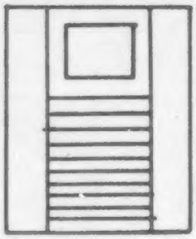
Picnic
Table



Informal
Pool



Formal
pool or
fountain



Barbecue

S.STATZER .CUR R.[illegible] CNTR. 1681-10

Site Analysis Checklist

	Yes	No
1. Does the walk or drive need to be relocated for greater convenience or attractiveness?	____	____
2. Do some trees need to be removed or changed?	____	____
3. Does the structure of the soil present a problem - clay, sand?	____	____
4. Is soil drainage adequate to support plant growth?	____	____
5. Is there a beautiful view on your property or off in the distance you wish to accent?	____	____
6. Are there special family needs which should be considered in the public area - walks, drives, etc.?	____	____
7. Are there special family requirements that should be considered in the living area - swimming pool, area for games, patio, etc.?	____	____
8. Are there special family needs that should be considered in the service area - clotheslines, dog house, play gym, etc.?	____	____
9. From which direction do the prevailing winds come?	____	____
10. Is drifting snow a problem in any particular area on the property?	____	____
11. Are there any unusual climatic factors (sun, wind, temperature) that should be considered before landscaping?	____	____
12. Are windbreaks or sound buffers required in any special areas on the property?	____	____
13. Do you need a place which will be screened for privacy on the property?	____	____
14. Are there any unusual terrain features that require wall, step, or fence construction?	____	____
15. Are there any unusual terrain features that require a special landscape treatment?	____	____
16. Are shade trees needed in any specific area for shading the house, patio, or other locations?	____	____

Source: Landscape Your Home, Ohio Agricultural Education Curriculum Materials Service.

Lesson 3

PLANT IDENTIFICATION AND SELECTION

Objective -- To develop the effective ability of homeowners to identify and select the proper ornamental plantings.

Problem and Analysis -- How can we identify and select ornamental plants?

-Factors in Plant Selection
-Selecting Trees
-Selecting Shrubs
-Selecting Vines, Groundcovers and Espaliers

Content

I. Factors in Plant Selection

A. In deciding on the kinds of plants to use in the landscape, the growth habits of the plant will be one of the prime considerations. When the need is for plants that will not block the vision, such as under windows or along walks, low growing plants are called for. Where the need is for framing, screening, shading, and windbreaks, a tall plant is called for.

Plants with an intermediate habit of growth are useful for plantings close to the house, for shrub borders, screens and hedges, and specimen plantings. Some plants are suitable for several purposes. Evergreens can be used for windbreaks, screening, borders, foundation plants, specimen plants, low-growing hedges, etc.

When selecting a plant always consider the mature size and shape. Select only those plants that will mature at the height and shape required.

B. The fruit, flowers, branching habits, and foliage will be important factors in identifying and selecting the plants to use in the landscape. The most pleasing results are obtained by having one shape, color, size or texture dominate while being supported by other characteristics. Example: a few pyramidal plants in a grouping of mostly rounded shaped plants adds interest without taking away from the effect of the rounded plants.

Both evergreen and deciduous plants should be used. A combination of both kinds will add interest to the plantings. Be sure to consider the year-round effect of any and all plants used in the garden. Evergreens can be further broken down into broadleaf or narrow-leaf, thus providing a wide array of plant textures. Among the deciduous plants are found innumerable choices of textures, flowers, fruit, branching habits, bark color, and foliage.

C. The plants selected should be known to be hardy in the area to be grown. Many references give the hardiness zone of plants. If the desire is for a particular plant in an area where it is not dependably hardy (such as some azaleas) a person may examine the area carefully and locate an area protected from the winter sun and strong winds (north or northeast exposure). This provides what is called a micro-climate.

D. Maintenance requirements should be considered before selecting a plant or plants. Maintenance requirements can be greatly reduced by proper spacing, locating the plants in an area of sufficient size so as to allow for full growth and development, selecting plants which are resistant to various insects and diseases, drought, and cold injury. A lesson on landscape maintenance is included in this unit.

E. It is important that a person know the scientific and common names of plants used for landscape purposes, because price lists and nearly all books on plants have plants listed alphabetically by scientific names. (Note: When stating that a person know scientific names of plants, it is not meant that he have them memorized. It means that the person should be familiar with the plant naming system and have access to a reliable source of scientific names for the specific plant desired.)

The common names of plants are confusing and misleading, they are selected with no definite system, and the same common name can be used to indicate any number of plants. For example, the common name red maple could apply to at least four kinds of maple trees. One of these is a small tree (sometimes referred to as a large shrub), while the remaining three are shade trees with different characteristics.

The scientific name for plants is composed of two parts: genus and a species. The scientific name is written in Latin and is definite and never duplicated. Reliable nurseries and garden centers will identify plants by their scientific names, as well as by varieties and cultivars. Nursery and seed catalogs also commonly list plants by genus, species, variety, and cultivars.

II. Selecting Trees

A. Trees generally have one stem (trunk) but some are allowed to grow with multiple trunks (clumps).

B. Trees serve many purposes:

-shade from the summer sun
-have attractive foliage, fruit, bark, or bloom
-provide protection from strong winds
-used for framing, screening and windbreaks.

C. The main root systems in trees are taproot and branching (a few trees have a fibrous root system e.g., sourwood).

A taproot system consists of one main root going deep into the soil with small roots and rootlets growing from this. The scarlet oak (Quercus coccinea) has a taproot system.

Most maple trees have a branching root system, also many of these roots grow close to the surface of the ground. These shallow roots plus the fact that they cast a dense shade, make it difficult for a thick stand of grass to survive. The roots take the nutrients and moisture, while the foliage blocks out needed light. In situations such as these the use of mulches or ground-cover plants is recommended. In fertile soils roots will grow deeper than in poor soils.

D. Trees should blend in well with the size of property and type of house. The larger the tree the fewer should be put on a given lot. The large trees selected for a small home should have a mature size of not over 30 to 40 feet.

Small trees probably should be used more than they are. They can add interest and variety to shrub plantings, can provide shade as well as privacy, and screen objectionable views.

E. Trees should be located far enough apart so as to avoid competition for light, soil and water. The roots of most trees extend approximately as far in the soil as the spread of branches and beyond. Large trees should be spaced 40 feet apart, while small trees should be spaced 15 feet or less apart.

Be careful to choose trees whose roots will not interfere with underground water, sewer and drain lines. Also, where there are overhead utility lines choose a tree whose mature height will be less than the lines.

F. Generally, when a person puts out shade trees the desire is for "instant" shade with too little regard to the individual tree. The fastest growing trees seldom make the best shade tree. The fast-growing trees are shorter-lived and have weaker wood, thus making storm damage a greater probability. Trees in this category include silver maple and black locust.

G. When selecting small trees do not overlook the value of dwarf fruit trees. They can be ornamental as well as useful. A person may desire to plant such trees toward the rear of the house so any dropped fruit will not detract from the appearance of the public area.

H. Some trees are especially susceptible to certain diseases or insects. This should be investigated before selecting a tree. For example, the dreaded Dutch elm disease makes it impossible to recommend the American elm tree whose lovely branches provided shade for many fine homes in times past.

I. The common shapes of deciduous trees are: round, weeping, pyramidal, columnar, vase-shaped, oval and spreading. The shapes of evergreens are columnar, pyramidal, round, spreading, or creeping.

Shade is best provided by spreading, round, oval, and vase-shaped trees.

Enframement is best provided with narrow pyramidal shaped, broad oval, globe, vase-shaped, and low to medium growing spreading trees.

Trees of almost any shape are suitable for background.

J. The trees form the basic parts to a good landscape selection. They are rather costly. They are slow-growing and should be selected with care. If the wrong choice is made and it becomes necessary to remove the unwanted tree after 8 or 10 years, then the person is back at the beginning again. Some trees are more subject to damage by diseases and insects, some trees are messy, the roots of some are damaging to sewer lines, and some are responsible for numerous seedling pests each year. There is a long list of trees from which to choose, and it is possible to choose ones without these restrictions. Trees not recommended for shade include:

1. American elm, Chinese elm, silver maple, common honey locust, Lombardy poplar, box elder, and weeping willow are all subject to damage by insects and diseases.
2. Silver maple and weeping willow have weak

wood and are a hazard because of wind and storms.

3. Box elder, silver maple, and weeping willow have roots that clog sewer lines and drain lines.
4. Catalpa is a very messy tree and tree-of-heaven is responsible for seedling pests.

K. Recommended Trees Hardy in Zones 6

1. Deciduous Trees

Scientific Name	Common Name	Mature Height	Mature Spread	Shape	Bark	Leaves	Flower	Fruit	Comments
Acer palmatum	Japanese Maple	15-20'	15-20'	Low, round -topped	Red-grey	Red or Green	-	-	Shrubby type growth
Acer platanoides	Norway Maple	50-50'	50'	Spreading round-topped	Dark grey	-	-	-	Subject to storm damage; many popular varieties available: Schwedleri
Acer rubrum	Red Maple	80'	40'	Round-Topped	-	Red in Autumn	Red	-	Somewhat weak-wooded
Acer saccharum	Sugar Maple Hard Maple	90'	50-60'	Round-Topped	-	Yellow to orange & red in autumn	-	-	Magnificent shade tree
Albizzia julibrissin	Mimosa	30'	30'	Wide-spreading	-	Fine Feathery	Pink	Early summer	Flowers attract humming birds, Freezes out from time to time
Amelanchier canadensis	Service-berry	30'	10-15'	Narrow Rounded Crown	-	Yellow to red in autumn	White		
Betula papyrifera	Canoe or Paper Birch	60'	30'	Pyramidal	Chalky White	Yellow in autumn	-	-	Birch trees are commonly grown with a multiple stem
Betula populifolia	Gray Birch	25'	15'	Slender Rounded	Gray	Yellow in autumn	-	-	"
Carpinus betula	European hornbeam	30-40'	20'	Round-Topped	Smooth	Yellow in autumn	-	-	

Scientific Name	Common Name	Mature Height	Mature Spread	Shape	Bark	Leaves	Flower	Fruit	Comments
Carpinus caroliniana	American Hornbeam	30'	15-20'	Bushy	Smooth	Orange to red in autumn	-	-	
Cercidiphyllum japonicum	Katsura Tree	40-60'	30'	Wide Spreading	Gray and firm	Yellow to scarlet in autumn	-	-	Sometimes grows with several trunks. Grows best in rich, moist soil.
Cercis canadensis	Redbud, Judas Tree	20-30'	20-30'	Spreading	Dark	Yellow in autumn	Spring Pink, Pealike		Also a white variety available. Best grown as multiple stemmed.
Chionanthus virginicus	Fringetree	15'					June fleecy white	Blue-black in autumn	Best as accent or specimen plant.
Cladrastis	Yellowwood	50'	40'	Wide round-topped		Yellow in autumn	White pealike spring		
Cornus florida	Dogwood	20-30'	20'	Spreading flat-topped		Red in autumn	White in spring	Scarlet berries in autumn	Best in partial shade. Branches give a layered effect.
Cornus florida rubra	Red flowering dogwood								
Crataegus phaenapyrum	Washington Hawthorn	25'	20'	Upright	Dark grey	Scarlet to orange in fall	Late spring	Red berries in fall	

Scientific Name	Common Name	Mature Height	Mature Spread	Shape	Bark	Leaves	Flower	Fruit	Comments
Fraxinus americana	White Ash	50-60'	50'	Wide-spreading Round-topped	-	Yellow in fall			Also available are red ash F. Pennsylvanica or green ash F. Pennsylvanica lanceolata.
Ginkgo biloba	Ginkgo or Maidenhair tree	50-60'	30'	Open Wide-spreading	Smooth grey-brown	Yellow in autumn			Be sure to get male trees as females bear an obnoxious fruit.
Gleditsia triacanthos inermis	Thornless Honeylocust	60'	50-60'	Wide spreading					Several varieties available such as Moraine, Shademaster, Imperial No. 1, Imperial No. 2 and Sunburst
Gymnocladus dioicus	Kentucky Coffeetree	60'	40'	Wide spreading	Rough	Yellow in fall	-	Fall Thick brown pods	
Koelreuteria paniculata	Goldenrain tree	30'	30'	Spreading round-topped	Rough brown-grey		Yellow clusters in summer		
Laburnum watereri	Goldenchain Tree	15-25'	15-20'	Flat-topped erect branches					

Scientific Name	Common Name	Mature Height	Mature Spread	Shape	Bark	Leaves	Flower	Fruit	Comments
Liquidambar styraciflua	Sweetgum	60'	40'	Broadly Pyramidal		Star-shaped scarlet in autumn		Round horned balls about 1 inch in diameter	
Liriodendron tulipifera	Tulip Poplar or Tulip Tree	60-100'	30-40'	Broadly Pyramidal			Tulip shaped Greenish-yellow		State Tree of Kentucky
Magnolia soulangeana	Saucer Magnolia	20'	20-25'	Low-branching broad & rounded	Smooth grey-brown		Large, white, pink, or red in early spring		Other magnolias are: Stao Magnolia Magnolia Stellata
Malus	Crabapple	to 50'		Spreading					**Sweetbay magnolia** M. Virginiana A large number of varieties are available
Platanus occidentalis	American Plane Tree Sycamore	90-100'	70-75'	Large spreading	Pale, peeling in flakes				Also available is London Plane Tree Platanus acerfolia

Scientific Name	Common Name	Mature Height	Mature Spread	Shape	Bark	Leaves	Flower	Fruit	Comments
Pyrus calleryana	Bradford pear	30-40'	15-25'	Conical		Glossy turning red to scarlet in autumn	1" flowers in profuse clusters in spring	Pea-sized inedible	
Quercus	Oak	75-100'	50-90'	Pyramidal to round topped					Many choices available: White oak, Q. alba; Red oak Q. borealis; Scarlet oak Q. coccinea Shingle oak Q. imbricaria; Bur oak Q. macrocarpa; Pin oak Q. palustris; Willow oak Q. phellos; English oak Q. robur
Sorbus aucuparia	Mountain Ash	40-50'	25'	Spreading branches curving up ovate head				Late summer	Fruit eaten by birds in winter.
Tilia cordata	Littleleaf Linden	60'	40'	Oval	Brown-grey				

2. Evergreen Trees (alphabetically arranged according to genus)

  a. Abies, Fir - Erect, pyramidal, evergreen trees with branches in whorls around a central trunk. Leaves are flat and linear, smooth edges and not sharp pointed. Cones are erect with deciduous scales. They grow slowly and are less highly regarded than pines or hemlocks. They are native to regions of high elevation. This makes it difficult to establish them in regions of hot summers.

  b. Cedrus, Cedar - Cedars grow best in warm dry areas. They have stiff needlelike foliage and erect cones.

  c. Ilex, Holly - The hollies are a large group of very popular ornamentals. All are not evergreen. On hollies the male flowers and female flowers do not occur on one tree. This makes it necessary to purchase at least one tree of each sex in order to be assured of a berry crop. In some cases it is possible to buy a female tree with a male branch grafted on to provide pollen for the flowers.

  d. Ilex opaca, American Holly - 40', pyramid, evergreen, red berries.

  e. Ilex aquifolium, English Holly - 30 ft., oval topped, hardy no farther north than zone 7.

  f. Juniperus, Juniper - Mostly small trees.
    1) Juniperus chinensis, Chinese Juniper - 30'-40'.
    2) Juniperus Virginiana, Eastern Red Cedar - 40', pyramidal or columnar, blue berries.

  g. Picea, Spruce - Spruces are evergreen conifers with a pyramid shape. They retain their foliage for four to six years resulting in a plant with dense foliage.
    1) Picea abies, Norway Spruce
    2) Picea pungens, Colorado Spruce - pyramid tree
    3) Picea pungens glauca, Colorado

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    a. *Abies*, Fir - Erect, pyramidal, evergreen trees with branches in whorls around a central trunk. Leaves are flat and linear, smooth edges and not sharp pointed. Cones are erect with deciduous scales. They grow slowly and are less highly regarded than pines or hemlocks. They are native to regions of high elevation. This makes it difficult to establish them in regions of hot summers.
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    d. *Ilex opaca*, American Holly - 40', pyramid, evergreen, red berries.
    e. *Ilex aquifolium*, English Holly - 30 ft., oval topped, hardy no farther north than zone 7.
    f. *Juniperus*, Juniper - Mostly small trees.
        1) *Juniperus chinensis*, Chinese Juniper - 30'-40'.
        2) *Juniperus Virginiana*, Eastern Red Cedar - 40', pyramidal or columnar, blue berries.
    g. *Picea*, Spruce - Spruces are evergreen conifers with a pyramid shape. They retain their foliage for four to six years resulting in a plant with dense foliage.
        1) *Picea abies*, Norway Spruce
        2) *Picea pungens*, Colorado Spruce - pyramid tree
        3) *Picea pungens glauca*, Colorado

Blue Spruce - has steel-blue foliage.

4) Picea pungens kasteriana - Kaster Blue Spruce is the bluest of the spruces.

h. Pinus - Pine

1) Pinus nigra - Austrian Pine is a dense, pyramidal, wide-spreading evergreen tree. It grows to an approximate height of 60 feet with a 40 foot spread.

2) Pinus strobus - White pine is another fine ornamental. The foliage is soft and flexible and the needles which are two to five inches long occur five in a bundle. The young tree has a pyramidal shape.

3) Pinus sylvestris - Scotch Pine is a pyramidal tree attaining a 60 foot height at maturity. They have a deep root system and will grow well even in poor soil.

i. Tsuga - Hemlock

1) Tsuga canadensis - Canadian Hemlock is a graceful needleleaf evergreen tree reaching a mature height of 60'-70'. They can be kept small for a rather long period of time by pruning.

III. Selecting Shrubs

A. Every shrub has one or more characteristic which make it usable in landscaping. One such characteristic may be the shape, which may be pyramidal, vase-shaped, semi-spreading, spreading, globe, weeping, rounded, upright or arching.

B. One of the greatest values of shrubs is the color of the leaves during the growing season and fall of the year. Other interest points are the flowers and fruit. Consider all these points and then select on the basis of which will be of the greatest value all year and not for just a short time.

C. The area can be made to appear large or small by the texture of the plants used. Groups of fine-textured shrubs in a small area will make it appear larger while coarse-textured plants would give a crowded effect. (As described in an earlier lesson in this unit, the texture depends upon the leaf surface and the spacing and size of the leaves of the plants.)

D. Plants with irregular growth are usually more attractive and less formal than those with close compact growth. By irregular growth is meant one whose growth is characteristically loose and somewhat open rather than close and dense.

E. In deciding on a particular shrub for a particular spot one should consider the mature size of the plant. This means height and spread. Generally, the spread of a shrub will be from 2/3 the height to equal the height.

F. Shrubs like trees are classified as deciduous, evergreen or semi-evergreen. Evergreens are broken down further to broadleaf or needle-leaf.

G. Shrubs are used as specimen plants, accents, foundation plants, borders, screens and hedges.
   1. A specimen plant is one which is a perfect example of its type and is outstanding in all respects. A specimen plant is usually planted by itself so it can be enjoyed. If planted with other shrubs, it should be larger and planted so that it can be looked upon as an individual plant.
   2. Accent plants are very similar to specimen plants. Specimen plants are usually planted alone; an accent plant is part of a group but of different height, color, form or texture. Pyramidal shaped evergreens are the most commonly used accent plant. Usually any pyramid-shaped plant is considered an accent. They are good to relieve the monotony of a group of plants of similar height. It is considered good taste to use restraint in selecting specimen plants and accent plants.
   3. Shrubs used for foundation plants should be ones that will make the house appear to

the texture of the plants used. Groups of fine-textured shrubs in a small area will make it appear larger while coarse-textured plants would give a crowded effect. (As described in an earlier lesson in this unit, the texture depends upon the leaf surface and the spacing and size of the leaves of the plants.)

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G. Shrubs are used as specimen plants, accents, foundation plants, borders, screens and hedges.
   1. A specimen plant is one which is a perfect example of its type and is outstanding in all respects. A specimen plant is usually planted by itself so it can be enjoyed. If planted with other shrubs, it should be larger and planted so that it can be looked upon as an individual plant.
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   3. Shrubs used for foundation plants should be ones that will make the house appear to

fit the site. They should not be ones that grow so large as to require heavy pruning. This destroys the natural shape of plants. Plants of round or spreading shape are preferred over those with stiff, upright branching habit. Shrubs are commonly placed at the doorway and rightfully so. However, even though they should be interesting, they should not compete with the doorway for attention. They should be no taller than 1/4 to 1/3 the distance from the ground to the eave. The corner plants should be no more than 2/3 the distance from the ground to the eave. Here also round, irregular-shaped plants are more attractive than upright plants. Even better is a group of several plants for the corner. They should be of different mature sizes. An upright plant can be used in this group.

4. Shrubs are ideal plants to be used for borders, screens, or hedges.
    a. For borders use several varieties and set them in groups. Repeat each variety at several locations throughout the border. Grouping several shrubs of the same variety and the repetition of this variety in several locations gives a more unified appearance. In order to avoid monotony use accent plants in a few locations.
    b. Shrubs used for hedges and screens should have dense foliage. They should be plants that can survive close together and, in the case of hedges, should be able to withstand heavy shearing. The foliage should reach to the ground. If tall plants do not have branching to the ground, they should be underplanted with low growing shrubs.

H. Avoid shrubs that are insect- or disease-prone unless willing to give constant attention to treating and spraying. The plant may die even with all the added attention.

I. As with trees, do not select shrubs whose hardiness is questionable unless micro-climates can be located that are more suitable.

J. Broad-leaved shrubs for home landscaping in Kentucky. (See Ky. Misc. 314

K. Additional Shrubs for Landscaping
  1. Buxus, Boxwood - A group of shrubs with small, smooth-edged evergreen leaves. They make excellent hedges. They stand shearing well. Their hardiness is questionable in the northern part of zone 6.
    a. Buxus sempervirens - Common Boxwood
    b. Buxus microphylla koreana, Korean Boxwood - The most hardy. This is the one recommended for the northern part of zone 6.
  2. Ilex crenata - Japanese holly is a broadleaf evergreen suitable for foundation or hedge plantings. There are several outstanding varieties.
    a. Ilex crenata hetzi - Hetz Holly
    b. Ilex crenata stokesi, Stokes holly - a very dwarf plant.
    c. Ilex crenata helleri - Heller's Holly is also a very dwarf and compact plant.
  3. Juniperus, Juniper - There are junipers that are classified as shrubs as well as trees. They have sharp pointed needle-like leaves.
    a. Juniperus horizontalis douglasi - Waukegan Juniper is a trailing plant with a bluish foliage.
    b. Juniperus horizontalis plumosa - Andorra Juniper is a low-growing plant, evergreen; the foliage turns purple in autumn. At maturity the plants may spread six feet but will be only 1½ to 2 feet tall. A valuable landscape addition.
  4. Taxus, Yew - This group is one of the most popular groups of plants used in landscaping, and rightfully so. They are evergreen with a dark green color, they grow in many kinds of soil and withstand clipping and pruning. This makes them suitable for hedges and screens as well as specimen plants.
    a. Taxus cuspidata nana - Dwarf Japanese yew is a slow-growing, wide-spreading shrub as is
    b. Taxus cuspidata dinsa.

c. Taxus media - A group of taxus that is very popular. There are scores of good taxus varieties.

IV. Vines, Groundcovers and Espaliers

A. Vines can be used in a variety of ways - foliage, screening, shade and overhead protection and beauty. They vary as far as climbing habits. Some have tendrils that provide support, some have small rootlets that attach to a support, some twist around for support while others cling directly. Some vines grow dense and provide a soil cover while others grow loosely and provide only partial covering.

1. Light, loose vines can be used to break up the monotony of the large flat surface of a wall or fence. They are also attractive against a lattice or wire fence.
2. Vines can be used to provide shade and protection over patios where trees are not high enough for this purpose.
3. As with all other plants, vines should blend into the total scheme.
4. Recommended vines for landscaping -

Scientific Name	Common Name	Comments
a. Clematis	clematis	Beautifully flowered. Some species bear flowers on the previous year's wood while some bear on the current seasons growth. Since pruning is necessary for maximum bloom, it is necessary that a person know the habits of each species. Many outstanding varieties are available.
b. Euonymus	wintercreeper	Evergreen foliage - many good varieties.
c. Hederahelix	English ivy	Evergreen climbing vine.
d. Ipomoea purpurea	morning glory	An annual plant. Grown from seeds. Blue to pink flowers.
e. Ionicera japonica	honeysuckle	Climbing plants with fragrant funnel-like flowers.
f. Parthenocissus quinquefolia	Virginia creeper	Vigorous growing vine.

g. Parthenocissus tricuspidata	Boston ivy	Deciduous vine mainly used for masonry walls.
h. Polygonum auberti	Silverfleece vine	Produces a mass of white flowers in late summer.
i. Vitis	Grape	Rapid growing, forming effective screens rapidly. They also bear an abundance of edible fruit.
j. Wisteria	Wisterias	Twining vines bearing long drooping clusters of flowers in spring. Vigorous grower.

B. Ground Covers

1. Ground covers are needed in most all home landscapes. They provide cover where grass does not grow or in areas where it is not practical to maintain grass (steep banks). They are used in front of shrubbery, in shrub-bed areas, under trees, or in a large bed to increase the scale of an area. Some can be grown in full sun, many in shade areas. Do not use ground cover plants in heavy traffic areas as they do not wear well.
2. A recommended selection of ground cover plants.
    a. Ajuga reptans - carpet bugle, bugleweed 4-12" tall, good for shade or sun; evergreen.
    b. Convallaria majalis - lily-of-the-valley, good for sun or shade. Bears clusters of small white bell-shaped flowers in late spring or early summer.
    c. Cotoneaster adpressa - creeping cotoneaster, deciduous growing to one foot tall, has small white flowers in late spring and bright red berries in autumn.
    d. Euonymus - wintercreeper, evergreen
    e. Hedera heli - English ivy, evergreen
    f. Juniperus - Juniper; varieties of Juniperus horizontalis are the best for ground covers.
    g. Lonicera japonica halliana - honeysuckle - use this plant very selectively as it can become a very serious weed.

h. Pachysandra terminalis - Japanese spurge - grows 6" tall and is perhaps the best for shaded areas. Foliage is evergreen.

i. Vinca minor - myrtle - does well in sun or shade. Has pale blue flowers in spring and evergreen foliage.

C. Espaliered plants are charming in the proper setting. This is the training of shrubs or small trees in a vine-like manner. They are especially attractive against a blank fence or wall. They can be trained to an informal pattern (most popular) or to a rigid pattern. An espaliered plant can be used to:

1. produce flowers or fruit
2. reduce glare and noise
3. create shadow effects and interesting lines and patterns
4. reduce bareness of blank walls
5. screen out undesirable views
6. background for other plants
7. can also be the main feature of a garden design

A wide variety of plants can be used for this purpose. Slow-growing plants are the best subjects for espaliers.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher

1. The natural shape and mature size of plants are of prime importance in selection as well as location.
2. The use of common names, along with a complete disregard of scientific names, can only mean trouble. Many plants have one common name in one area and a different common name in a neighboring area. Scientific names are universal. If a person anywhere in the world calls a certain plant by its scientific name, a person familiar with the naming system can determine the exact plant being talked about.

3. The selection of the proper tree presents a problem to the home owner. The selection of a tree is based on desirable characteristics such as foliage color, form, texture, showiness of flowers, rate of growth, and mature size (height and spread). The suitability of a tree will be determined by such things as soil, exposure, architectural style of the house, and the size of the area to be landscaped.
4. There are over 5,000 different kinds of wood plants available for landscaping today. This presents a fascinating as well as a bewildering array. The selection of shrubs, their proper use, and maintenance requirements are especially important to the homeowner. Also, to be considered are flower color, and growth habits, as well as size. No one shrub or grouping of shrubs can be used in all situations. Therefore, a person needs a knowledge of many shrubs.
5. After a careful selection of trees and shrubs, a person will still be confronted with the problem of a finished appearance, something to tie the entire picture together. This touch may very well be provided with vines and/or ground cover plants.

B. Things to be brought out by the class members.
   1. Their knowledge of the different plants recommended for use in their area.
   2. Their interest and experience in locating micro-climates where more tender plants can become established.
   3. Expression of personal likes and dislikes of listed plants.

II. Conclusions

A. Choose specific plants only after carefully considering the environment in which they will have to live (soil, climate, moisture, light available, and wind exposure). In addition, shape, growth habits, texture, and colors of the plants will be factors influencing the decision.

B. Slow-growing trees of medium height, requiring little care and offering a show of flowers, foliage or fruit are most desired.

C. The spread of a tree is more important than the height in determining its ability to provide summer shade.

D. Generally trees planted to provide shade should be set on the south to southwest side of the home.

E. Spreading, globe, broad oval and vase-shaped trees make excellent shade trees.

F. Narrow conical, broad oval, globe, vase-shaped and selected low to medium growing spreading shaped trees are excellent for enframement.

G. Trees of most any shape are suitable for background.

H. A low-growing tree with an open branching habit is best used for enclosure.

I. In selecting plants to be used as foundation plants a person should select taller-growing shrubs for the corners. If space permits, a grouping of lower-growing plants around the taller ones will add interest.

J. Shrubs can be used effectively as borders or screen plantings for the purpose of providing separations in the yard to create interest, block views, and give privacy.

K. Borders and screens look beter if fewer varieties are used and several plants of one variety are grouped together.

III. Enrichment Activities

A. Visit a home site that has a variety of mature trees and shrubs.

B. Visit a 10-year-old planting (or some other planting, so long as the age is known) to observe

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III. Enrichment Activities

A. Visit a home site that has a variety of mature trees and shrubs.

B. Visit a 10-year-old planting (or some other planting, so long as the age is known) to observe the growth that has been made during this period.

C. Have the students make up lists of plants which are similar in size, shape, and texture.

D. Take a completed landscape plan and have students prepare a list of appropriate substitute plants for each type of tree or shrub listed on the completed plan.

E. Visit an arboretum to study labeled plant specimens.

F. Have the students collect pictures (in color if possible) and descriptions if plants from all possible sources such as magazines, newspapers, nursery catalogs, and the like. Try to get pictures of the individual plants at different seasons of the year.

G. Use any experts available to discuss plant selection. This may be an extension specialist, nurseryman, or the like.

IV. Suggested Teaching Materials

A. References

1. Approved Practices in Beautifying The Home Grounds by Norman K. Hoover, pp. 125-142.
2. Betty Ajay's Guide to Home Landscaping by Betty Ajay, pp. 119-208.
3. Evergreens by James Underwood Crockett and The Editors of Time-Life Books.
4. Flowering Shrubs by James Underwood Crockett and The Editors of Time-Life Books.
5. Gardening and Home Landscaping by Jack Kramer, pp. 87-132.
6. How to Plan and Plant Your Property by Alise Recknagel Ireys, L.A., pp. 42-58.
7. Landscaping and the Small Garden by Marjorie J. Dietz, pp. 29-74.
8. Landscape Design, A Teacher's Manual, The Penn State University, pp. 22-90.
9. Landscape Gardening by James Underwood Crockett and The Editors of Time-Life Books, pp. 99-153.

10. Landscaping Your Home by William R. Nelson Jr., Cir. 858, pp. 47-72; 129-156.
11. Minimum Maintenance Gardening Handbook by Walter F. Bruning, pp. 81-121.
12. Planning The Home Landscape, H. S. Unit 81, Instructional Materials Laboratory, U of K.
13. Reader's Digest Practical Guide To Home Landscaping, pp. 210-253.
14. Shrubs For Landscaping, Ohio Agricultural Education Curriculum Materials Service.
15. Shrubs For The Home Grounds, Correspondence Course No. 137, The Penn State University.
16. Trees by James Underwood Crockett and the Editors of Time-Life Books.
17. Trees For Landscaping, Ohio Agricultural Education Curriculum Materials Service.
18. Trees For The Home Grounds, Correspondence Course 135, The Penn State University.
19. Useful Trees and Shrubs by Florence B. Robinson (card file on plants).
20. Vines, Ground Covers, and Espaliers, Correspondence Course No. 140, The Penn State University.

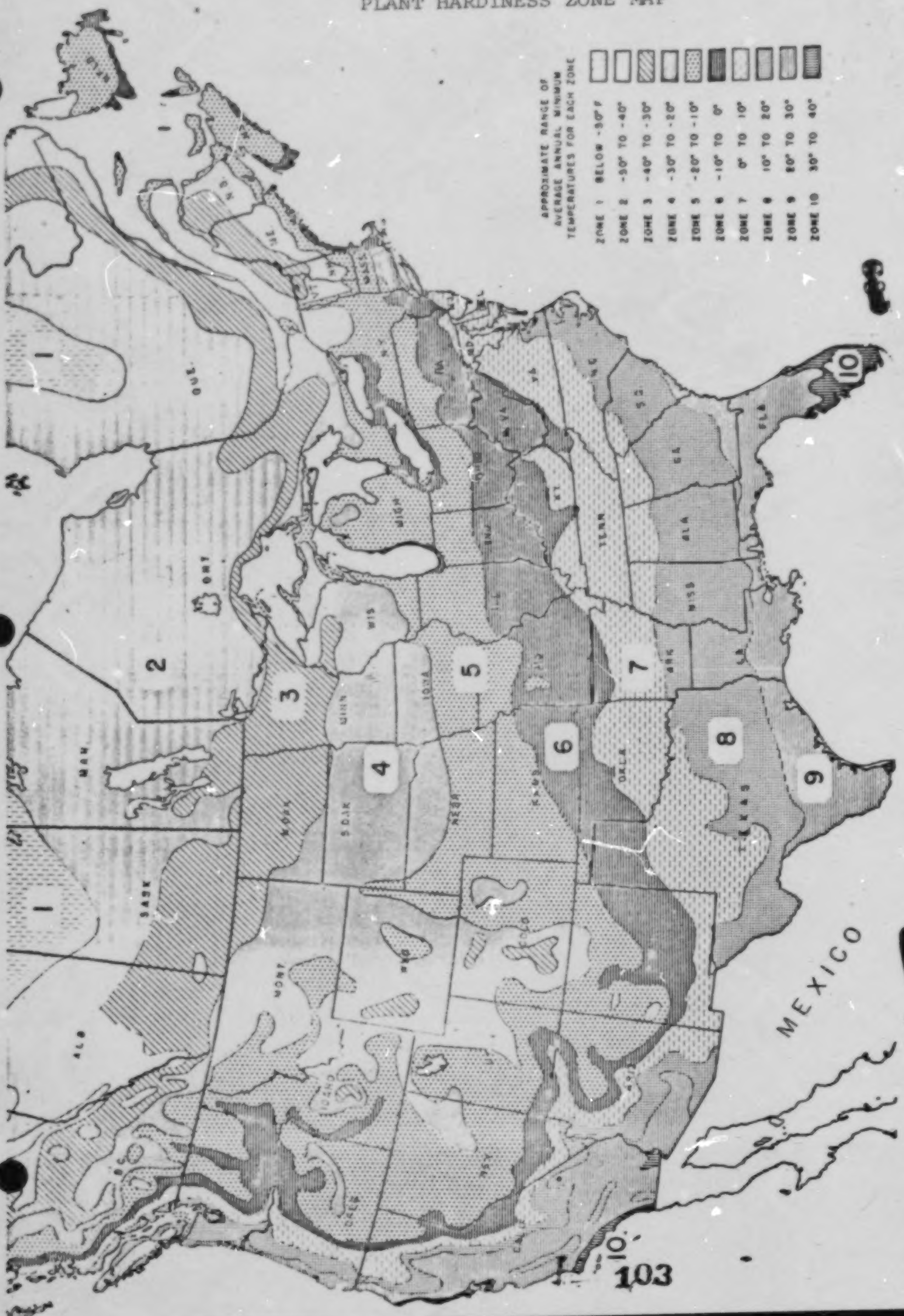
B. Resource Personnel
1. Extension specialist
2. Nurseryman
3. Garden Editor for newspaper or magazine
4. For specific personnel see Vo-Ag Directory of Resource People in Kentucky.

C. Audio-Visuals
1. Masters
    - -1 Plant Hardiness Zone Map
    - -2 Factors in Selecting Trees
    - -3 Basic Tree Shapes
    - -4 Tree Growth
    - -5 Tree Location
    - -6 Trees for Framing
    - -7AB Trees for Background
    - -8 Espalier Patterns
    - -9 Uses of Vines
    - -10 Use of Ground Covers
    - -11 Steps in Making A Bark Graft
    - -12A-D Shrubs for Kentucky Plantings

[redacted]

2. Slide Series
    a. "Commonly Used Trees, Shrubs, Ground Covers, and Vines," Ohio Agricultural Education Curriculum Materials Service.
    b. "Viburnum," Ohio Agricultural Education Curriculum Materials Service.

PLANT HARDINESS ZONE MAP


APPROXIMATE RANGE OF
AVERAGE ANNUAL MINIMUM
TEMPERATURES FOR EACH ZONE
ZONE 1 BELOW -50° F
ZONE 2 -50° TO -40°
ZONE 3 -40° TO -30°
ZONE 4 -30° TO -20°
ZONE 5 -20° TO -10°
ZONE 6 -10° TO 0°
ZONE 7 0° TO 10°
ZONE 8 10° TO 20°
ZONE 9 20° TO 30°
ZONE 10 30° TO 40°
1
2
3
4
5
6
7
8
9
10
MEXICO
ALB
SASK
MAN
ONT
QUE
N.B.
N.S.
MONT
IDAHO
WYO
ORE
NEV
CAL
COLO
N DAK
S DAK
NEBR
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OKLA
TEXAS
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IOWA
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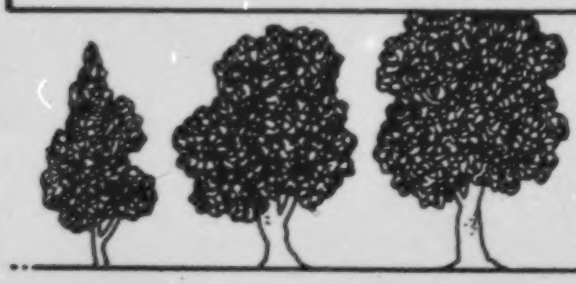
ILL
MICH
IND
OHIO
KY
TENN
MISS
ALA
GA
FLA
S.C.
N.C.
VA
W VA
PA
N.Y.
MASS
ME

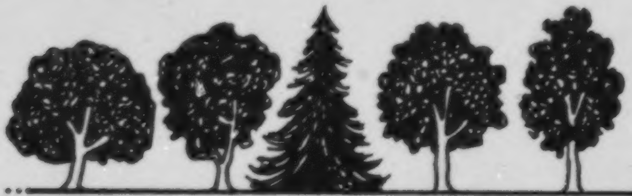
Source: USDA

Adult 110-3-1

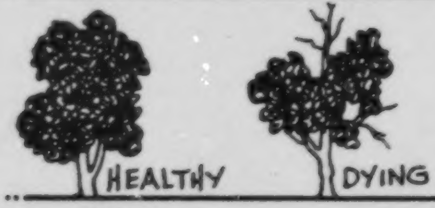
FACTORS IN *Selecting* TREES



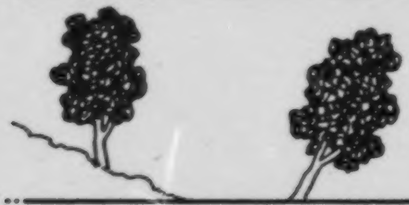
MATURE SIZE OF TREE



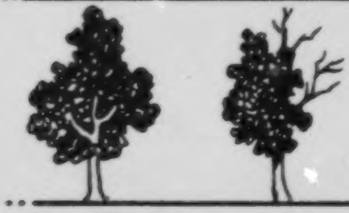
SHAPE & APPEARANCE OF TREE



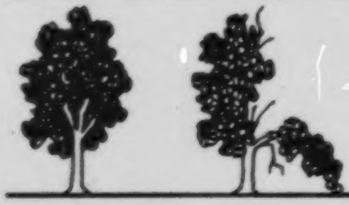
NUMBER YEARS OF USEFULNESS OF TREE



ADAPTABILITY to EXISTING GROWING CONDITIONS



DISEASE And INSECT RESISTANCE

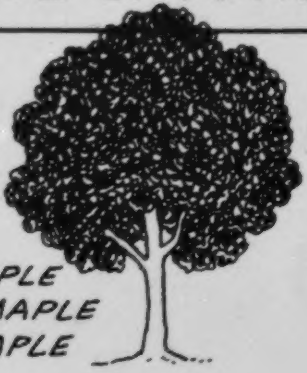


STORM DAMAGE RESISTANCE

[redacted]

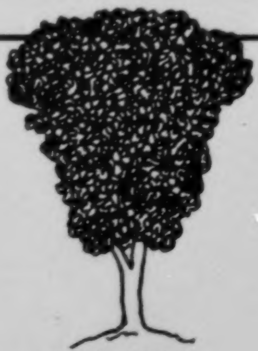
T. VANTREESE, INST. MATL. LAB., U.K.

The SHAPE OF A TREE IS IMPORTANT



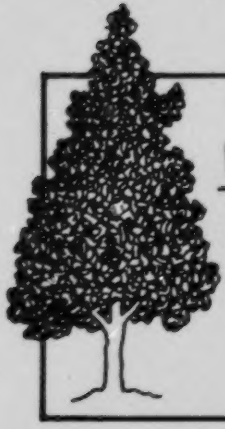
UPRIGHT ROUNDED

ASH
SUGAR MAPLE
SOME RED MAPLE
NORWAY MAPLE



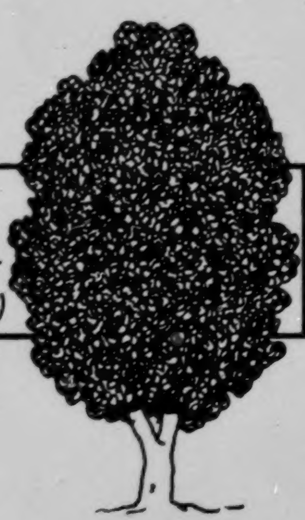
VASE-SHAPED

SAWLEAF ZELKOUA
HONEY LOCUST



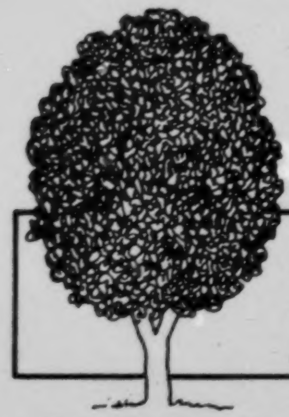
PYRAMIDAL

PIN OAK
GINKGO
SYCAMORE (Young)



LITTLELEAF LINDEN
Some RED MAPLE
SYCAMORE (AGED)

UPRIGHT OVAL



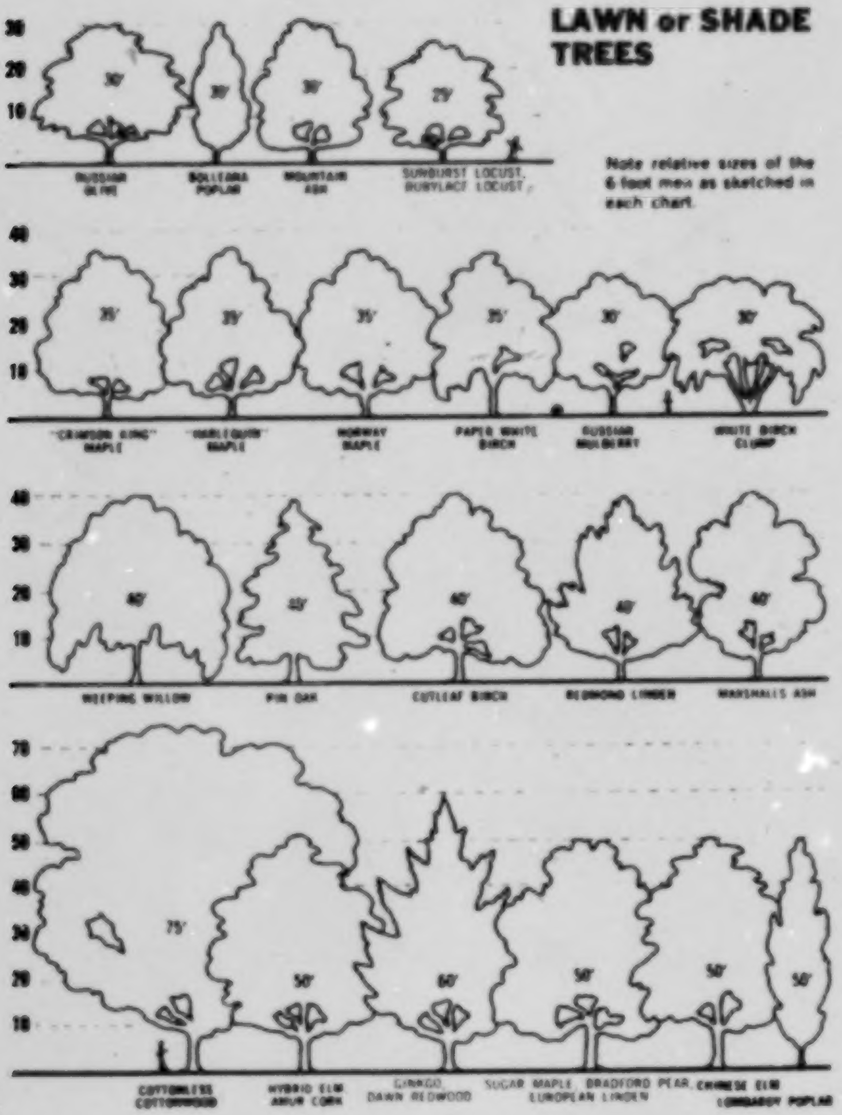
RED OAK
WHITE OAK
CRABAPPLE
Some RED MAPLE

ROUND OR GLOBE-SHAPED

[redacted]

T.VANTREESE, INST. MATL. LAB., U.K.

TREE GROWTH

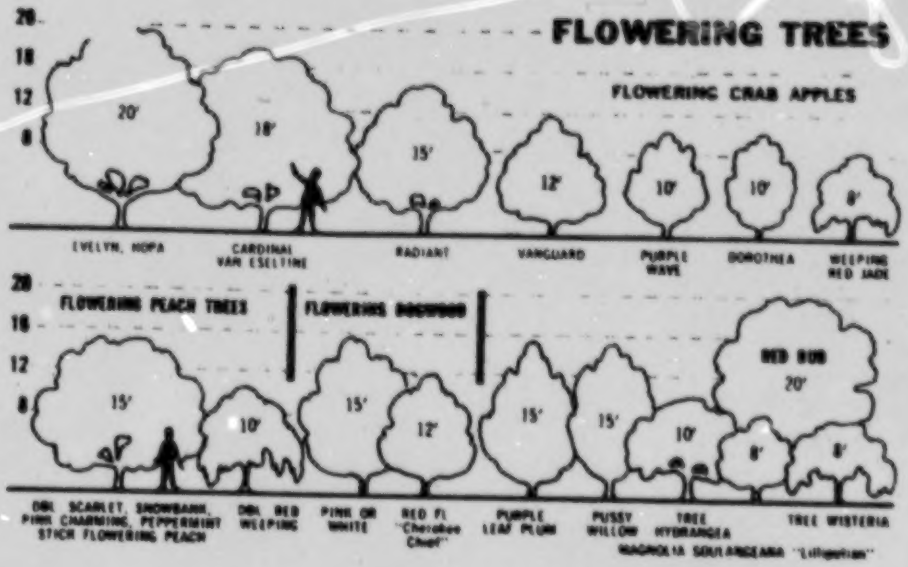


LAWN or SHADE TREES

Note relative sizes of the 6-foot men as sketched in each chart.

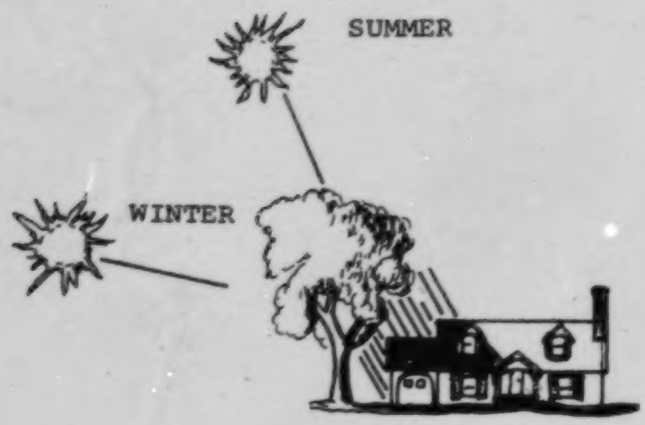
Source: USDA [redacted] Adult 110-3-4A

TREE GROWTH

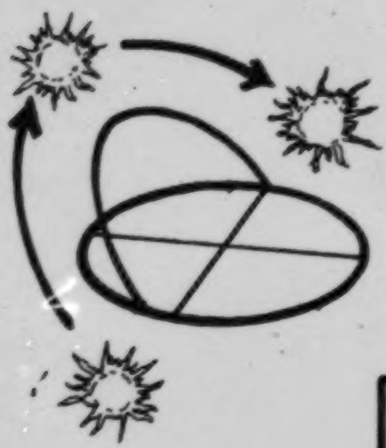


Adult 110-3-4B

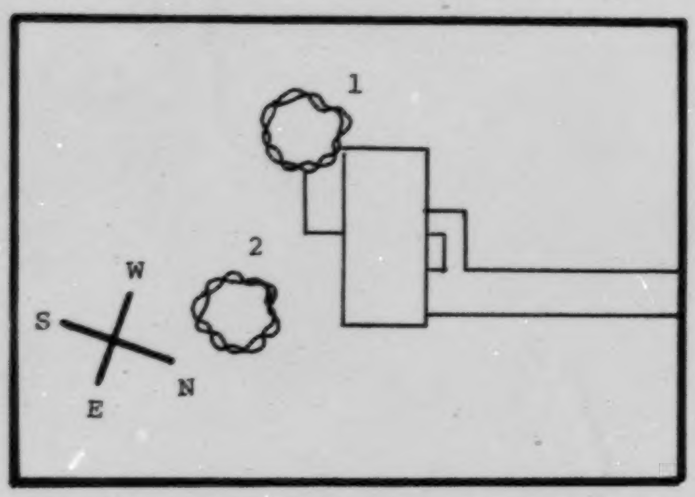
TREE LOCATION



Locate trees close to the area to be shaded.



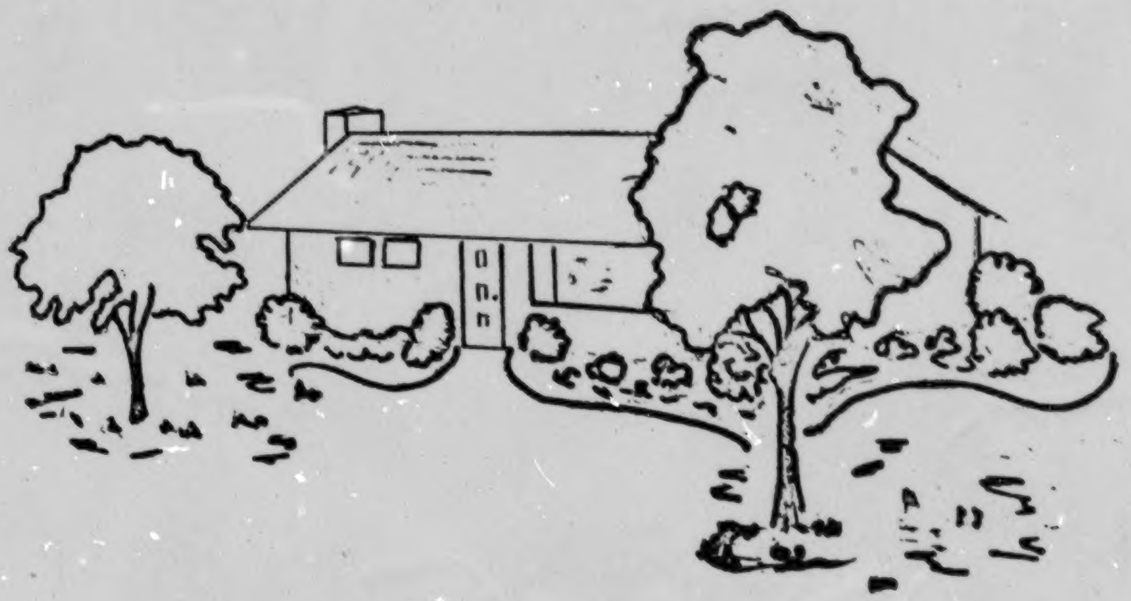
To provide afternoon shade, trees should be located to the southwest of the area to be shaded.



Tree number 1 shades the patio during the late afternoon. For shade during early afternoon hours, plant in a more southerly position. Tree number 2 shades the yard area in the morning but is located too far from the patio to provide afternoon shade.

S. STATLER. CURR. DEVEL. MTR. 1081-11 UK

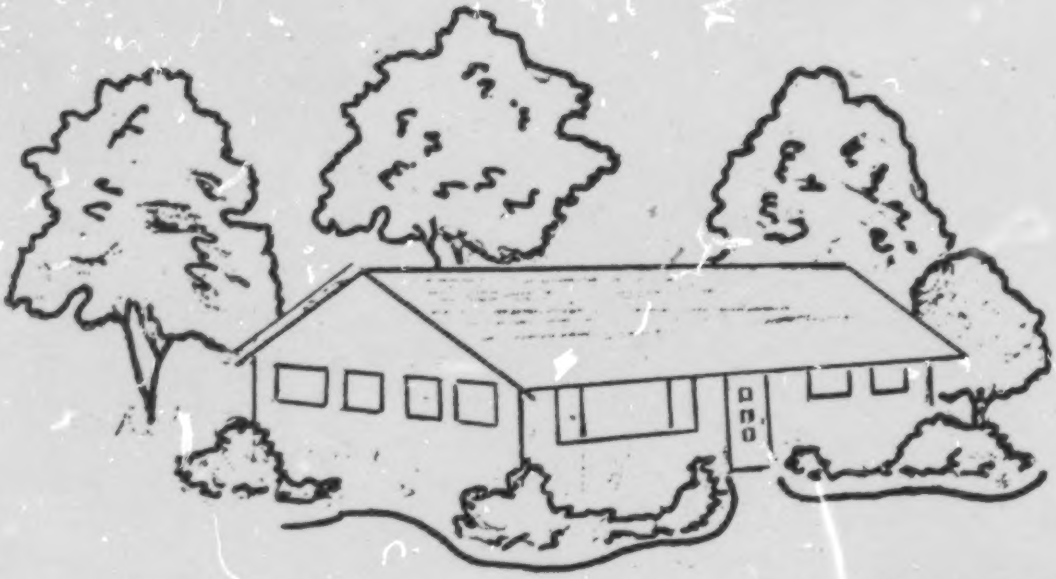
Trees For Framing



Source: Ohio Agricultural Education Curriculum Materials Service.

Adult 110-3-6

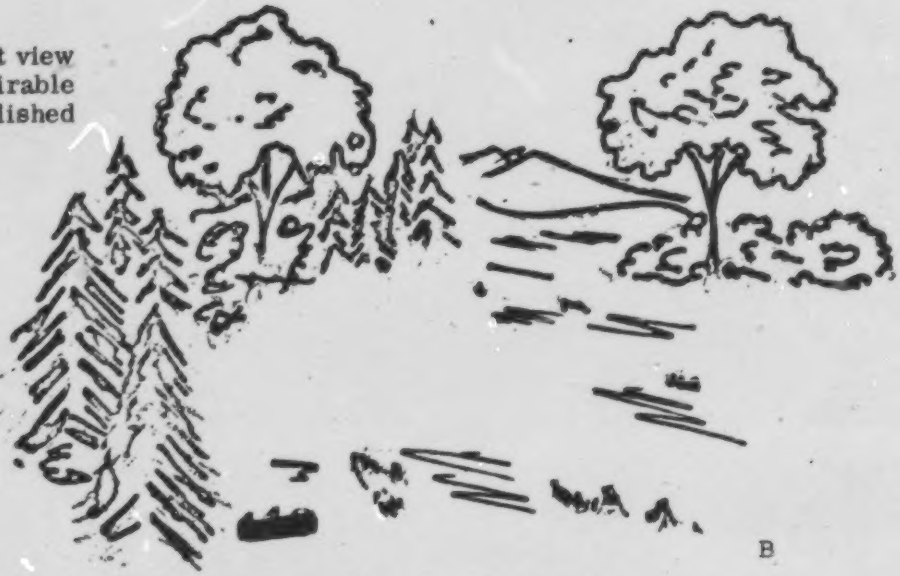
TREES FOR BACKGROUND



Trees in the rear yard provide shade and background in the landscape.

A

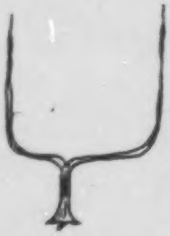
Enframement of a distant view or screening of an undesirable view can also be accomplished with trees.



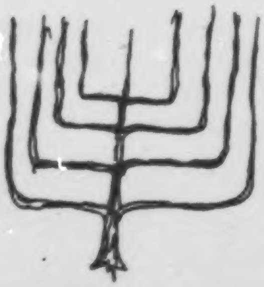
B

Source: Ohio Agricultural Education Curriculum Materials Service.

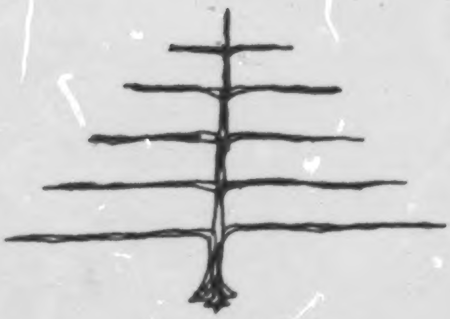
ESPALIER PATTERNS



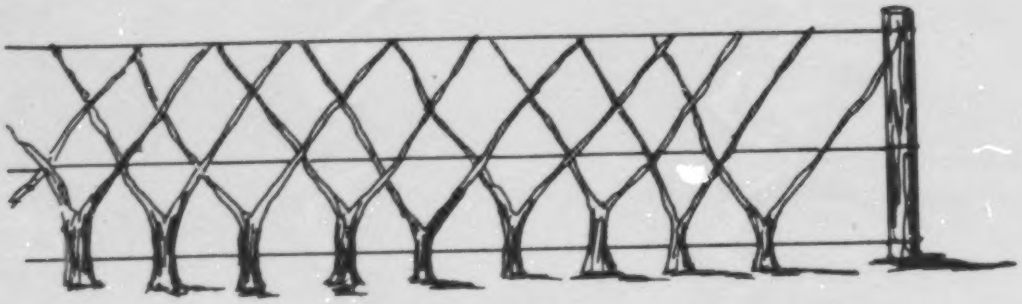
U-Shaped



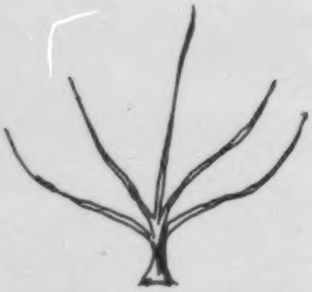
Candelabrum



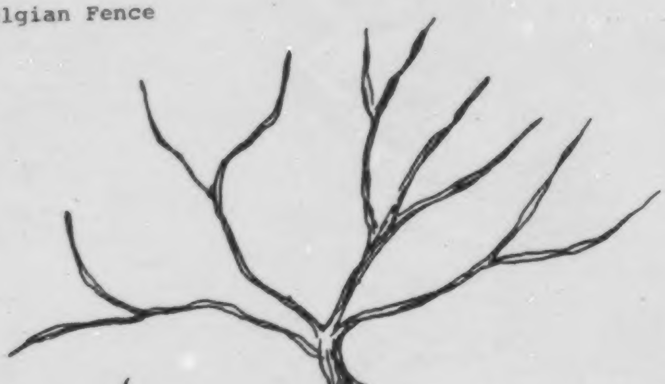
Pyramid



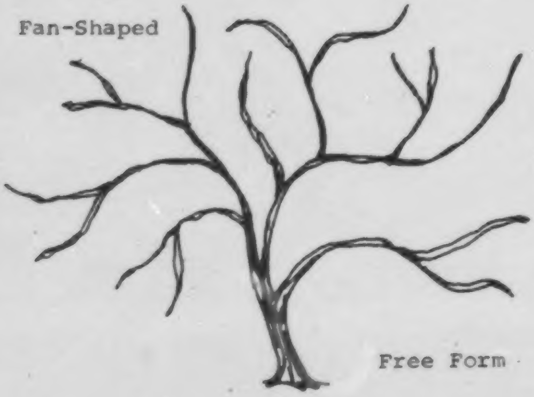
Belgian Fence



Fan-Shaped



Informal Fan-Shaped

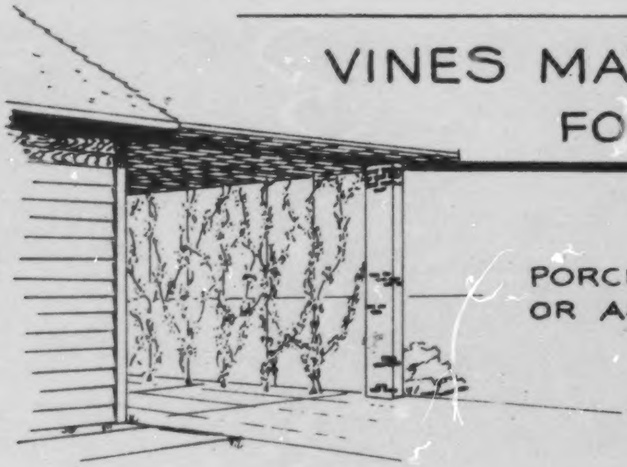


Free Form

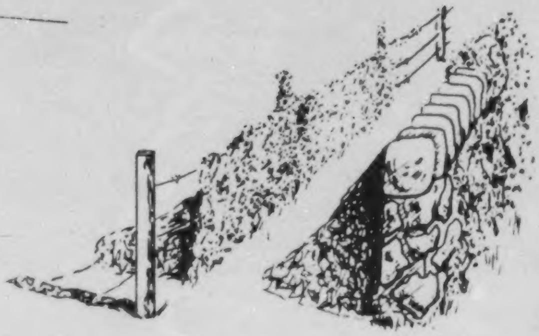
Adult 110-3-8

S.STATE CURR.CNTR.UK 1081 U

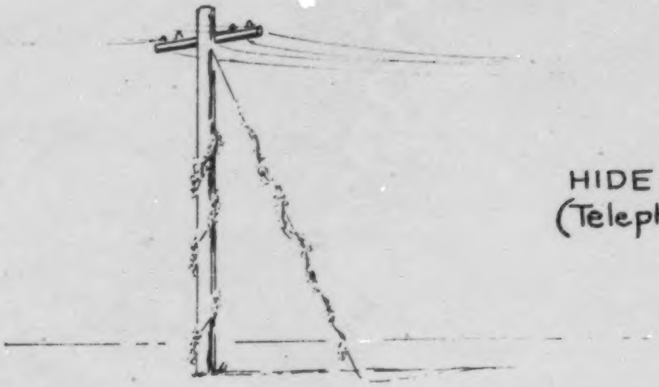
VINES MAY BE USED THE FOLLOWING WAYS



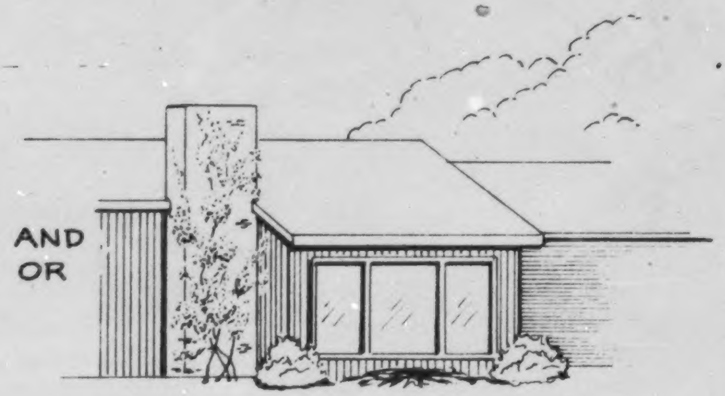
PORCH OR PATIO COVERS, OR AS SCREENING PLANTS



COVERS FENCES OR WALLS



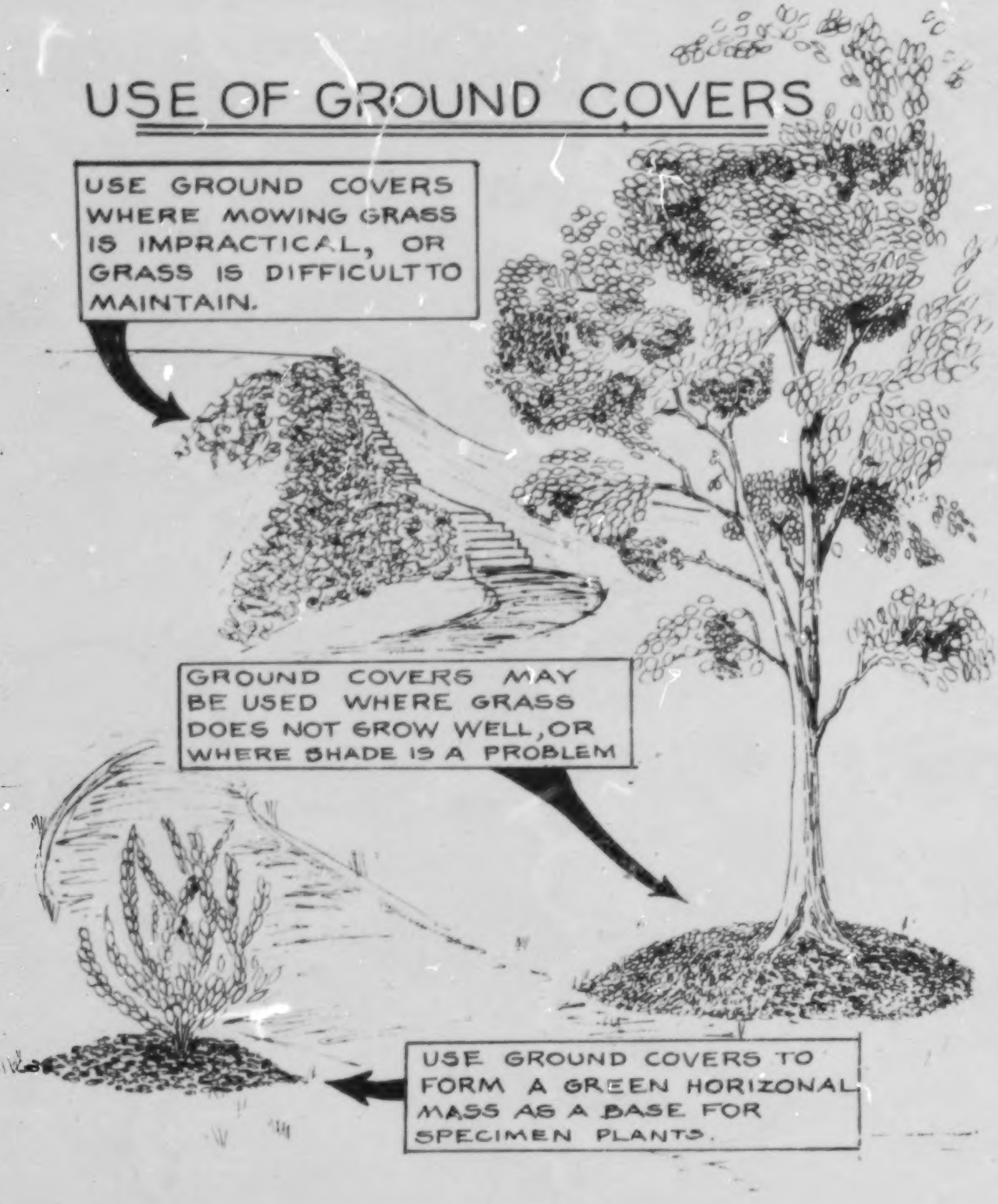
HIDE DISTRACTING FEATURES (Telephone poles, etc.)



CLIMBERS ON WALLS AND CHIMNEYS OF BRICK OR STONE HOUSES.

R. GILMORE, INST. MATL. LAB., U.K.

USE OF GROUND COVERS



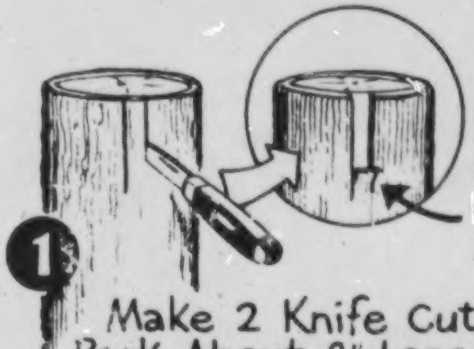
USE GROUND COVERS WHERE MOWING GRASS IS IMPRACTICAL, OR GRASS IS DIFFICULT TO MAINTAIN.

GROUND COVERS MAY BE USED WHERE GRASS DOES NOT GROW WELL, OR WHERE SHADE IS A PROBLEM

USE GROUND COVERS TO FORM A GREEN HORIZONAL MASS AS A BASE FOR SPECIMEN PLANTS.

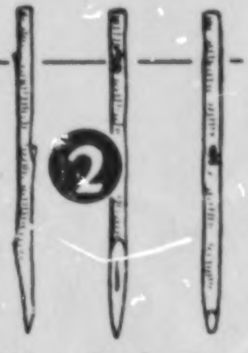
K GILMORE, INST. MATL. LAB, UK

STEPS IN MAKING A BARK GRAFT



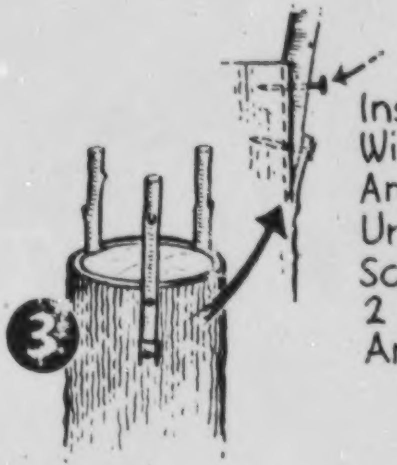
Lift This Strip of Bark And Cut Off Upper 2/3, Leaving A Small Flap At At The Bottom.

Make 2 Knife Cuts Through Bark About 2" Long And As Wide As The Scion To Be Used.

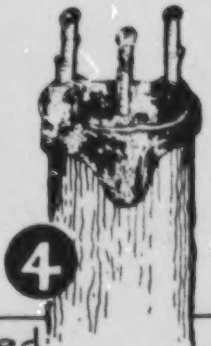


Cut Scions As Shown With A Long Taper On One Side And A Short Cut On The Opposite.

Side - Back - Front



Insert Scions Into Slots In Bark With Long Tapered Side Inward - And The Short Taper Slipped Under The Remaining Flap. The Scions Must Be Secured With 2 Nails, One Through The Flap And One Above It.



...Then The Grafted Stub Is Ready To Be Waxed.

T. VANTREESE, INST. MATL. LAB., U.K.

SHRUBS FOR BORDER AND/OR FOUNDATION PLANTING

(Available and Used in Kentucky)

Scientific Name[1]	Common Name[1]	Mature Size Height (feet)	Mature Size Spread (feet)	Color (if effective) Flower	Color (if effective) Fruit	Color (if effective) Fall	Remarks[2]
Abelia grandiflora	Glossy Abelia	5-6	4	Pinkish	. . .	Reddish	Foundation; semi-evergreen
Aronia arbutifolia	Red Chokeberry	6-8	3-5	White	Red	Crimson	Foundation
Azalea[3] spp & hybrids	Azalea	2 up	2 up	Various	. . .	. . .	Foundation; semi-shade; acid soil. Deciduous to Evergreen
Azalea mollis	Chinese Azalea	3-5	3-5	Yellow, red, orange	. . .	Red	Foundation; acid to neutral soil
Berberis julianae	Wintergreen Barberry	3-6	2-5	Yellow	Black	Green	Foundation; evergreen
Berberis julianae 'Compact'	Compact Wintergreen Barberry	3-5	3-4	Yellow	Black	Green	Foundation; evergreen
Berberis mentorensis	Mentor Barberry	4-5	5-6	Yellow	. . .	Red	Semi-evergreen
Berberis thunbergi	Japanese Barberry	3-6	4-7	Yellow	Red	Red	
Buddleia alternifolia	Fountain Buddleia	8-12	6-10	Lilac	. . .	. . .	Sunny
Buddleia davidi	Orange-eye Butterfly Bush	3-8	3-6	Various	. . .	. . .	Foundation; sunny
Buxus sempervirens	Common Boxwood	15-20	15-20	. . .	. . .	. . .	Evergreen
Callicarpa dichotoma	Purple Beauty Berry	5-6	4-5	Pinkish	Violet	. . .	Foundation; sunny
Calycanthus floridus	Common Sweetshrub	3-6	5-8	Maroon	Brown	Yellowish	
Cephalanthus occidentalis	Buttonbush	10-15	10-15	Creamy	. . .	. . .	
Chaenomeles lagenaria	Flowering Quince	4-8	6-10	Various	. . .	. . .	Foundation; sunny
Clethra alnifolia	Summersweet Clethra (Sweet Pepperbush)	3-6	3-6	White, Pink	Brown	Yellow	Foundation; semi-shade to shade
Cornus alba sibirica	Siberian or Coral Dogwood	8-10	10-12	White	White	Red	Foundation
Cornus stolonifera	Redosier Dogwood	6-8	8-10	White	Whitish	Red	Foundation
Cornus stolonifera 'Variegated'	Variegated Redosier Dogwood	6-8	8-10	White	Whitish	Reddish	Foundation
Corylus avellana	European Filbert or Hazel	15-20	15-20	Yellow	. . .	. . .	Sunny
Cotinus coggygria	Common Smoke Tree	10-15	15-20	Yellowish	Whitish Purplish	Yel to Red	Sunny
Cotoneaster apiculata	Cranberry Cotoneaster	2-3	4-6	White	Red	Red	Foundation
Cotoneaster divaricata	Spreading Cotoneaster	5-6	6-7	White	Red	Red	Foundation
Daphne cneorum	Rose Daphne (Garland Flower)	1	2-4	Pink	White	Green	Foundation; evergreen
Deutzia gracilis	Slender Deutzia	2-3	3-5	White, Pink	. . .	. . .	Foundation
Deutzia lemoinei	Lemoine Deutzia	4-8	4-8	White	. . .	. . .	Foundation
Deutzia scabra 'Pride of Rochester'	Pride of Rochester Deutzia	6-8	4-8	White	. . .	. . .	Foundation
Euonymus alatus	Winged Euonymus	8-10	8-10	Yellowish	Rose-pink	Rose-red	
Euonymus alatus 'Dwarf' (Compactus)	Dwarf Winged Euonymus	4-6	4-6	Yellowish	Rose-pink	Rose-red	Foundation
Euonymus fortunei radicans	Common Wintercreeper	to 20	3-4	Greenish	Pink-Orange	. . .	Evergreen; foundation; Vine or shrub.
Euonymus fortunei vegetus	Big-leaf Wintercreeper	to 20	3-4	Greenish	Pink-Orange	. . .	Evergreen; foundation; Vine or shrub.
Euonymus japonicus	Evergreen Euonymus	8-12	5-6	Greenish	Pink-Orange	. . .	Sunny; evergreen

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[1] The nomenclature used here follows Standardized Plant Names, 2nd. Ed. 1942.

[2] Unless otherwise designated, these plants will do well in full sun or light shade. All do well in the border. Those which are also suitable for foundations are so designated. All are deciduous unless otherwise noted.

[3] [illegible]

SOURCE: Ky. Misc. 314.

Adult 110-3-12 A

Scientific Name[1]	Common Name[1]	Mature Size Height (feet)	Mature Size Spread (feet)	Color (if effective) Flower	Color (if effective) Fruit	Color (if effective) Fall	Remarks[2]
Euonymus kiautschovicus (patens)	Spreading Euonymus	6-7	6-7	Greenish	Pink-Orange	...	Sunny; semi-evergreen; foundation
Forsythia intermedia	Border Forsythia (several varieties)	6-10	6-10	Yellow	...	...	Foundation; sunny
Forsythia 'Dwarf Arnold'	Dwarf Arnold Forsythia	2-3	4-5	Yellow	...	...	Foundation; sunny
Hamamelis vernalis	Vernal (Winter Blooming) Witch-hazel	5-6	6-8	Yellow	...	Brownish	Foundation
Hamamelis virginiana	Common Witch-hazel	20-30	20-25	Yellow	...	Brownish	
Hibiscus syriacus	Althaea or Rose of Sharon	8-12	6-10	Various	...	...	
Hydrangea arborescens grandiflora	Snowhill Hydrangea	4-6	5-8	White	...	Yellowish	Foundation; sun or shade
Hydrangea macrophylla	Big-leaf Hydrangea	4-6	5-8	Pink, Blue	...	...	Foundation; semi-shade or shade
Hydrangea paniculata 'Peegee' (grandiflora)	Peegee Hydrangea	15-25	15-25	Pinkish	...	...	
Hydrangea quercifolia	Oakleaf Hydrangea	4-6	3-5	White	...	Dull red	
Hypericum 'Sun Gold'	Sun Gold Hypericum	2-3	3-4	Yellow	...	...	Foundation; semi-evergreen; semi-shade or shade
Ilex cornuta 'Burford'	Burford Chinese Holly	8-10	8-10	White	Red	...	Foundation; evergreen
Ilex cornuta 'Rotunda'	Rotund Chinese Holly	2-3	3-4	...	...	...	Foundation; evergreen
Ilex crenata (many varieties)	Japanese Holly	1-20	2-7	White	Black	...	Foundation; evergreen; sun or shade
Ilex glabra	Inkberry	6-8	8-10	White	Black	...	Foundation; sunny; evergreen
Ilex verticillata	Winterberry	6-8	3-5	White	Red	...	Foundation; semi-shade
Kalmia latifolia	Mountain Laurel	3-10	3-8	Pink	...	...	Foundation; semi-shade; evergreen; acid soil
Kolkwitzia amabilis	Beauty Bush	6-8	6-9	Pink	...	Yellowish	Sunny
Lagerstroemia indica	Crape Myrtle	5-30	5-15	Various	...	...	
igustrum amurense	Amur Privet	10-15	10-12	White	Black	...	
gustrum lucidum 'Compact'	Compact Glossy Privet	6-8	6-8	White	Black	...	Foundation; sun or shade; evergreen; use in warmer areas
Ligustrum obtusifolium regelianum	Regels Privet	5-6	6-8	White	Black	...	Foundation
Ligustrum ovalifolium	California Privet	10-15	10-12	White	Black	...	
Ligustrum vulgare	European (Common) Privet	12-15	12-15	White	Black	...	
Lonicera fragrantissima	Winter Honeysuckle	5-8	5-6	White	Red	...	Semi-evergreen
Lonicera korolkowi zabeli	Zabel Honeysuckle	10-12	10-12	Pink	Red	...	Sunny
Lonicera morrowi	Morrow Honeysuckle	6-8	8-10	White	Red	...	Sunny
Lonicera tatarica	Tatarian Honeysuckle	10-12	10-12	Pink	Red	...	
Magnolia stellata	Star Magnolia	6-8	8-10	White, Pink	...	...	Foundation; sunny
Mahonia aquifolium	Oregon Hollygrape	4-5	4-5	Yellow	Blue	Bronzey	Foundation; semi-shade or shade; evergreen
Mahonia bealei	Leatherleaf Mahonia	8-10	6-8	Yellow	Blue	...	Foundation; semi-shade or shade; evergreen
Mahonia pinnata	Cluster Mahonia	4-6	4-5	Yellow	Blue	...	Foundation; semi-shade; evergreen
Malus sargenti	Sargent Crabapple	6-8	6-8	White Pink	Red	Yellowish	Foundation
Nandina domestica	Nandina	4-8	4-6	Pinkish	Red	Red	Semi-evergreen
Osmanthus americanus	Devilwood	8-10	8-10	White	...	...	Foundation; semi-shade; evergreen
Philadelphus coronarius	Sweet Mockorange	10-12	10-12	White	...	Yellowish	
Philadelphus lemoinei	Lemoine Mockorange (many varieties of variable sizes)	4-6	4-8	White	...	Yellowish	
otinia villosa	Oriental Photinia	10-15	8-10	White	Red	Red	
eris japonica	Japanese Pieris	8-10	6-8	White	...	...	Foundation; semi-shade or shade; acid soil

(Continued)

Scientific Name[1]	Common Name[1]	Mature Size		Color (if effective)			Remarks[2]
		Height (feet)	Spread (feet)	Flower	Fruit	Fall	
runus caroliniana	Carolina (Cherry) Laurel	15-20	6-10	White	...	...	Semi-shade; evergreen; use in warmer areas
Prunus glandulosa	Flowering Almond	4-5	3-4	White, Pink	...	Yellowish	Sunny; foundation
Prunus laurocerasus shipkaensis	Shipka Laurel	5-6	5-6	White	...	...	Foundation; semi-shade; evergreen
Prunus laurocerasus zabeliana	Zabel Laurel	5-6	5-6	White	...	...	Foundation; semi-shade; evergreen
Prunus tomentosa	Manchu (Nanking) Cherry	8-10	10-15	White	Red	...	
Prunus triloba 'Multiplex' (plena)	Double Flowering Plum	8-12	10-12	Pink	...	...	
Pyracantha coccinea lalandi	Laland Firethorn	10-15	10-15	White	Orange	...	Foundation; evergreen
Pyracantha coccinea pauciflora	Sparse Firethorn	4-6	4-6	White	Orange	...	Foundation; evergreen
Rhododendron catawbiense	Catawba Rhododendron	4-8	5-8	Various	...	...	Foundation; semi-shade, or shade; evergreen; acid soil
Rhododendron maximum	Rose Bay Rhododendron	8-12	8-12	Various	...	...	Foundation; semi-shade, or shade; evergreen; acid soil
Rhus aromatica	Fragrant Sumac	2-6	6-10	Yellow	Red	Scarlet	Foundation; sun or shade
Rhus typhina	Staghorn Sumac	15-30	20-25	Greenish	Red	Red	
Rosa harisoni	Harison Yellow Rose	5-6	6-8	Yellow	Black	...	Foundation; sunny
Rosa hugonis	Father Hugo Rose	6-10	10-12	Yellow	Black	Yellowish	Foundation; sunny
Rosa rugosa	Rugose Rose	4-6	4-6	Rose	Red	...	Sunny
Salix discolor	Pussy Willow	15-20	15-20	Grey	...	...	
Spiraea arguta	Garland Spirea	4-5	5-6	White	...	...	Foundation; sunny
Spiraea bumalda 'Anthony Waterer'	Anthony Waterer Spirea	2-3	3-5	Reddish	...	Reddish	Foundation; sunny
iraea prunifolia 'Double' (plena)	Double Bridal Wreath Spirea	4-6	6-8	White	...	Orange	Foundation; sunny
Spiraea vanhouttei	Van Houtte Spirea	8-10	10-12	White	...	...	Sunny
Spiraea vanhouttei 'Double' (plena)	Double Vanhoutte Spirea	6-8	8-10	White	...	...	Sunny
Syringa chinensis	Chinese Lilac	10-15	10-15	Dark lilac	...	...	Sunny
Syringa persica	Persian Lilac	6-8	5-10	Lilac	...	...	Foundation; sunny
Syringa villosa	Late Lilac	6-10	4-10	Lilac	...	...	Sunny
Syringa hybrids	(several)	6-15	6-15	Various	...	...	Sunny
Tamarix pentandra	Fivestamen Tamarisk	12-25	12-15	Pink	...	...	Sunny
Viburnum carlcephalum	Hybrid Carles Viburnum	6-8	6-8	White	...	Red	Foundation; sunny
Viburnum carlesi	Fragrant (Carles) Viburnum	4-8	6-8	White	Black	Red	Foundation; sunny
Viburnum carlesi 'Compact'	Compact Fragrant Viburnum	4-5	5-6	White	...	Red	Foundation; sunny
Viburnum dentatum	Arrowwood	6-8	6-10	White	Blue	Red	
Viburnum juddi	Judd Viburnum	5-6	6-8	Pinkish	...	...	Foundation; semi-evergreen
Viburnum lantana	Wayfaring Tree	12-15	12-15	White	Black	Red	
Viburnum opulus 'Snowball' (sterile)	Common Snowball	10-12	12-15	White	...	...	
Viburnum rhytidophyllum	Leatherleaf Viburnum	10-12	10-12	White	Black	...	Sunny; evergreen
Viburnum rhytidophylloides	Lantanaphyllum (Hybrid Leatherleaf) Viburnum	10-12	10-12	White	...	...	Sunny; evergreen
Viburnum setigerum	Tea Viburnum	5-8	6-8	White	Red	...	Foundation; sunny
Viburnum sieboldi	Siebold Viburnum	15-20	10-15	White	Blue	...	Sun or Shade
Viburnum tomentosum mariesi	Maries Doublefile Viburnum	8-10	8-10	White	Black	Red	Foundation; sun or shade
Viburnum tomentosum sterile	Japanese Snowball	8-10	8-10	White	..	Red	Sun or shade
Viburnum trilobum	American Cranberry Bush	6-12	8-12	White	Red	...	Foundation; sun or shade
eigela spp and hybrids	Weigela	5-6	5-6	Various	...	...	Foundation; sunny

SHRUBS FOR BORDER AND/OR FOUNDATION PLANTING

(Not Readily Available Nor Widely Enough Used in Kentucky for Evaluation)

cientific Name[1]	Common Name[1]	Mature Size		Color (if effective)			Remarks[2]
		Height (feet)	Spread (feet)	Flower	Fruit	Fall	
Abelia zanderi 'Goucher'	Edward Goucher Abelia	3-5	3	Lilac-Pink	. . .	Reddish	Foundation; semi-evergreen; use in warmer areas
Abeliophyllum distichum	Korean Abelialeaf	3-5	3-4	White	. . .	Yellowish	Foundation; sunny; semi-evergreen
Berberis buxifolia	Magellan (Box) Barberry	2-3	2-3	Yellow	Purplish	Scarlet	Foundation; semi-ever green
Berberis verruclosa	Warty Barberry	2-3	3-4	Yellow	Violet Black	Scattered Red	Foundation; semi-shade or shade; evergreen
Caryopteris clandoensis 'Blue Mist'	Blue Mist Blue Beard	2-3	3-4	Blue	. . .	Grayish	Foundation; sunny
Corylus avellana 'Curly' (contorta)	Lauder's Walking Stick	8-10	8-10	Yellow	. . .	. . .	Sunny
Cotoneaster racemiflora 'soongorica'	Sungari Cotoneaster	4-6	5-8	White	Red	Red	Foundation
Cotoneaster salicifolia	Willowleaf Cotoneaster	8-10	8-10	White	Red	. . .	Foundation; sunny; semi-evergreen; use in warmer areas
Daphne mezereum	February Daphne	3-4	3-4	Rose-Purple	Red	Red	Foundation; sunny
Hydrangea serrata 'Acuminata'	Acuminata Hydrangea	3-4	4-5	Blue	. . .	. . .	Foundation
Ilex serrata	Finetooth Holly	6-8	3-5	White	Red	. . .	Foundation; semi-shade
Leucothoe catesbaei	Drooping Leucothoe	3-6	2-6	White	. . .	. . .	Foundation; semi-shade or shade; evergreen; acid soil
Ligustrum japonicum	Japanese Privet	8-10	8-10	White	Black	. . .	Evergreen; use in warmer areas only
Osmanthus ilicifolius	Holly Osmanthus	6-8	5-7	White	. . .	. . .	Foundation; semi-shade or shade; evergreen
Paeonia suffruticosa	Tree Peony	4-6	4-6	Various	. . .	. . .	Semi-shade
Parrotia persica	Persian Parrotia	8-10	8-10	Brown	. . .	Scarlet	
Pieris floribunda	Mountain Fieris (Fetterbush)	2-6	10-14	White	. . .	. . .	Foundation; evergreen
Poncirus trifoliata	Trifoliate Orange	10-15	10-15	White	Yellow	. . .	
Prunus japonica	Chinese Bush (Korean) Cherry	4-5	4-5	White	Red	Red	Foundation; sunny
Pyracantha coccinea 'Bound'	Bound Firethorn	6-8	6-8	White	Orange	. . .	Foundation; evergreen
Rosa foetida bicolor	Austrian Copper Rose	6-8	6-8	Coppery Red	Red	. . .	Foundation; sunny
Rosa foetida persiana	Persian Yellow Rose	6-8	6-8	Yellow	Red	. . .	Foundation; sunny
Rosa zanthina	Manchu (Double Hugonis) Rose	8-10	10-12	Yellow	Red	Reddish	Foundation; sunny
Skimmia foremani	Foreman Skimmia	2-5	3-6	White	Red	. . .	Foundation; shade; evergreen
Spiraea arcuata	Spirea	3-4	4-5	White	Reddish	. . .	Foundation; sunny
Spiraea trilobata 'Swan Lake'	Swan Lake Spirea	3-4	4-5	White	. . .	. . .	Foundation; sunny
Stephanandra incisa 'Dwarf' (nana)	Dwarf Cut-leaf Stephanandra	3	4-6	Whitish	. . .	Bronzey	Foundation
Stewartia ovata (pentagyna)	Mountain Stewartia	6-15	6-12	White	. . .	Red	
Stewartia ovata (pentagyna) grandiflora	Showy Mountain Stewartia	6-15	6-12	White	. . .	Red	
Styrax wilsoni	Chinese (Wilson) Styrax	5-6	5-6	White	. . .	. . .	Foundation; semi-shade
Syringa amurensis japonica	Japanese Tree Lilac	30-40	25-30	White	. . .	. . .	Sunny
ringa josikaea	Hungarian Lilac	8-12	6-12	Red-violet	. . .	. . .	Semi-shade
Syringa velutina (palibiniana)	Manchurian Lilac	4-5	5-6	Lilac	. . .	. . .	Foundation; sunny
Vaccinium corymbosum	Highbush Blueberry	7-12	8-10	White	Blue	Orange	Acid soil; mulch deeply with sawdust
Viburnum wrighti hessei	Small Wright Viburnum	5-6	6-8	White	Red	Red	Foundation
Xanthoceras sorbifolium	Shinyleaf Yellowhorn (Chinese Buckeye)	12-15	8-10	White	. . .	. . .	Sunny

Lesson 4

LANDSCAPE CONSTRUCTION

Objective -- To develop the effective ability of homeowners to properly construct landscape features.

Problem and Analysis -- How should we construct desired landscape features?

- Paved areas
- Enclosures
- Furniture and accessories
- Storage facilities and shelters
- Garden lighting
- Greenhouses and other plant-growing structures
- Pools and water gardens
- Barbecue
- Working with basic construction materials

Content

I. Paved Areas

A. Paved areas consisting of walks, driveways, parking areas, steps and patios, will all be included in many home surroundings.

B. If these areas are to serve the intended purpose, they must be of sufficient size. Some size recommendations are as follows:

1. Driveways and parking areas. At least 10 feet wide for a single drive and 20 feet for a double drive. Where the driveway meets the street, the corners should be curved to make for easy turning.

   In building a circular drive or providing a turn-around area, provide an inside radius of at least 18 feet. Here, also, the width of the drive should be at least 10 feet wide (for single lane) or 20 feet wide (for two lanes). The turn-around area should be provided wherever possible, as this avoids the danger of having to back a car out of the garage directly onto the street. In addition, this area can serve as a parking area for guests.

2. Walks and steps. The main entrance walk should be wide enough for two people to walk side by side. This means a minimum width of five feet. The secondary walks (those leading to the back door or through some other area) can be of a lesser width.

   It has been stated earlier that proper planning is the first essential to a successful project, and certainly steps are no exception to this. Unless carefully planned they are actually dangerous. It is not the height of the riser that makes for safe steps, nor is it the width of the tread. It is the relationship between the two (tread and riser). In planning steps, a good rule-of-thumb to follow is the tread plus twice the riser should equal approximately 22.* This gives the following combinations:

   3" riser - 20" tread
   4" riser - 18" tread
   5" riser - 16" tread
   6" riser - 14" tread
   7" riser - 12" tread
   6" riser - 12" tread

   *This may be varied somewhat, but only slightly.

3. Patio. The minimum size recommended for a patio is twice the size of the indoor living area. Of course, this area can be considerably larger if resources permit.

C. In providing serviceable steps, patios, walks and driveways, it is necessary that they have a proper base. This consists of removing enough of the top layer of soil so as to lay this base and the surfacing material. The base may consist of sand, gravel or any other coarse material. This prevents water from collecting directly under the paving material. Such water could be responsible for causing the pavement to crack due to the freezing and thawing process to which it is subjected in cold weather.

D. There are several suitable materials available for surfacing the areas being considered. A person may choose to pave the driveway with gravel alone. If this is the choice, expect to have the problem of gravel washing into the surrounding areas in all but level ground. Concrete or asphalt will be more permanent and attractive. In addition to these there are other choices especially suitable for walks and patios. They include exposed aggregate concrete, quarry tile, brick (installed on a sand base or set in mortar) pre-cast concrete patio blocks, wood rounds or blocks, fieldstone, flagstone, or in some cases, combinations of more than one of the mentioned materials. Since the front walk serves the purpose of leading guests to the front door, it should be surfaced with a material firm and smooth. The surface of secondary walks may be materials such as tanbark or pine needles (especially attractive in wooded areas). Secondary walks may also consist of stepping stones placed at intervals close enough to allow for easy walking.

Steps should always provide a firm surface. They may be constructed of concrete, wood, stones, block or brick. Railroad ties are extremely useful in constructing garden steps, in cases where steps are used to provide for easy traffic from one level to another. In such areas do not forget to provide for the free movement of wheeled equipment. Ramps of grass, concrete or other paving materials should be provided to permit the moving of machines from one level to another.

E. For some ideas concerning shapes and locations of the patio refer to enclosed transparency masters.

F. Paving with brick or patio blocks offers some possibilities as far as paving patterns. Some patterns are plain, basket weave, ladder, Spanish, herringbone, or spiral.

G. Where a steep slope makes some other type of terrace impossible, a wooden deck may be the happy answer.

II. Enclosures

Enclosed gardens are just now coming into favor. Originally, our ancestors used front porches, gardens, and sidewalks as a means of communication with the neighborhood. People have now been moved off the front porch to the back yard in privacy. Several factors are responsible. Some are: A large number of motor vehicles traveling at too fast a speed across the front view, also polluting the air with noise and gasoline fumes. The backyard that was once given over to clotheslines, garbage cans, and woodsheds has become the private outdoor living room. By using enclosures (fences, walls and hedges) a person, in addition to screening out unwanted views and providing privacy, has the same opportunity for handling outdoor space that interior walls and room dividers provide inside a house.

A. There are several functions or purposes of enclosure elements.
   1. All areas used for outdoor living should be screened from the public view.
   2. Undesirable views should be screened off.
   3. Service areas within the property should be screened from the outdoor living area and the principal windows of the house.
   4. The use of partitions in a garden can produce a feeling of security. Few people are as relaxed in a large, open area as they are in an area that is at least partially enclosed.

B. Some choices for walls and fences are as follows:
   1. Masonry walls provide a durable, impenetrable, and expensive enclosure. Materials that can be used are stone, concrete block, brick, tile and poured concrete.

2. Fences do not possess the massive characteristics of masonry walls, the initial cost is less, and there is a wider range of choices as far as materials and design. Some of the choices include split, rough sawn, or finished wood, plywood, hardboard, and plastic. As for wood, cedar and redwood have the longest life. Some of the best wood is rough sawn.

C. The pattern chosen can be one of many.
   1. Louvers of 1-inch boards set vertically or horizontally are popular and attractive.
   2. White pickets blend especially well with colonial architecture.
   3. Basket weave is attractive on both sides.
   4. Plank fences using 1-inch boards with a narrow space between each board can be constructed to make both sides attractive. This is accomplished by building so that one board is on one side of the stringer and the next board is on the other.
   5. Board-and-batten consists of 1-inch boards, usually placed vertically with a pattern of overlaid small strips covering the cracks.
   6. Split rail fences are most suitable on suburban and rural properties.
   7. Stockade fences give a rustic and inviting appearance.
   8. Bamboo reeds bound with wire are found in local markets. When framed with 2" x 4"s, they make an inexpensive and attractive fence.
   9. Materials such as fiberglass when set in panels make low-maintenance, handsome fences that can be sawed, nailed, painted, or left natural.
   10. Wire or chain-link fences, while not attractive alone, can be made acceptable with plantings to screen them or vines trained on them to soften their harsh lines.

D. Construction needs to be carefully done to ensure a strong, long-lasting installation. Board fences are fastened to stringers run between wood posts which have been treated with a wood preservative and set 3 feet deep.

E. Wood fences can be painted or left to weather. In the case of a picket fence, it may be considered a necessity that it be painted. Once painted they must be kept painted if they are to look attractive and well-kept. If the decision is made not to paint the fence but to let it weather, a person should consider treating the wood with a clear wood sealer. In addition, the fence can be stained in any of a variety of colors. The use of galvanized nails to prevent rust stains on the wood is recommended. A stain will wear better than paint. A good stain job becomes more beautiful as it ages.

F. The height of the fence or wall may be regulated by a local ordinance. This should be checked out before beginning. A six-foot height will give stand-up privacy providing the surrounding area is on the same level, or lower than, the given area.

G. The use of retaining walls is a neat and strong way to handle changes in grade level in a garden. For heights up to 2 feet the stone, block or other material can be laid up dry (no mortar) with a large flat stone as a foundation. Railroad ties are also an excellent material for retaining walls. When the wall is higher than 2 feet, block or brick must have mortar. Stone can be laid up dry but skill is required. Footings, preferably concrete, must go below the frost line. Weep holes should be provided to allow for drainage of the ground above. Depending upon the height of the wall and type of construction, the wall may need to be tilted backwards; in the case of a dry wall as much as 1-inch for every 6 inches height.

III. Furniture and Accessories

A. Portable furniture has several advantages over others. It can be moved to follow the sun or shade, the change of seasons, moved for sociability or privacy, and stored to assure maximum years of use. A piece of movable furniture should not weigh more than 35 lbs. If the weight is more than 35 lbs. it should be fitted with casters or made to knock apart.

B. Ready-made plans for garden furniture and accessories are available from several sources. Plans for redwood chairs and lounges are often available from the California Redwood Association (617 Montgomery Street, San Francisco, California 94100). Plans for many items are sometimes featured in home, garden, and handyman magazines. A wide range of project plans can be purchased from the American Plywood Association (Tacoma, Washington 98400). Other possible sources are: Georgia-Pacific Corporation (Commonwealth Building, Portland, Oregon 92707) and Masonite Corporation (Dover, Ohio 44622).

C. Some suggested dimensions are:
  1. Maximum seat height for a chair is 19 inches (a dining chair is 16-17 inches).
  2. Lounge chairs can be as low as 6 inches with a correspondingly deeper seat.
  3. The minimum size seat area is 15-inches-square; 15 inches deep by 19 inches wide is better.
  4. Allow a minimum of 22 inches width per person when building benches--26 inches if the bench doubles as a table.
  5. Three heights for tables:
     a. 18 inches--coffee table
     b. 19 inches--serving table doubling as a bench
     c. 28½ inches--standard dining height
  6. An 8-inch height is ideal for a bench to be used for sunbathing. The width can be 24 to 28 inches.

D. Tables can be made of various materials
  1. Concrete blocks can serve as an excellent base; adhere them with mortar to any masonry floor. Angle irons to the block to complete the table.
  2. Drain and flue tiles can be a base for small tables. They are available in several sizes. On a patio they can be weighed

with concrete rounds, or glass. In the garden the tile should be partially buried for stability. Fill partially with sand and finish filling with concrete, in which a bolt is embedded to hold the top.

3. Use redwood to make a simple, crosslegged picnic table.
4. A discarded wooden core from a roll of wire cable makes a unique table.

E. Benches are a popular garden project. Wood, metal, concrete, and brick are all likely candidates for construction material.

1. Our simple bench can be made using 2-inch redwood for the top, spaced about ½ inch apart and set in concrete blocks 3 feet apart.
2. Another sturdy bench can be made with one 6 foot section of 2" x 10" or 2" x 12" plus 2 pieces 12 inches long for the legs. Using a 2" x 4" board as a brace, assemble the bench.
3. A slat-topped bench is another idea. Use 1" x 2" lumber set on edge spaced 1 inch apart in a wooden frame. Attach this to supports.
4. A garden bench can be cast in concrete for a permanent, carefree addition.
5. One versatile item that can be built is a combination bench/table. This item is too wide for a proper bench and too low to be used exclusively as a table. Children can play on it, a person can sun on it, and it can be used for snacks, picnics, displays, hobbies, etc. Such a table/bench can be square or round. Cushions can be added for color and comfort.
6. Remove the seat from a discarded horse-drawn farm implement and have it welded to a galvanized pipe to use as a stool. They can be made any height.
7. Two automobile wheels can be welded together to form the base for a seat or table. Cut a round board to fit in the circle, cover with foam rubber and a colorful cloth

that can be left outside and enjoy an inexpensive, unique piece of furniture.

F. Most homes, in one or more locations, require a container or planter of some sort. Wood is a popular material for tubs, boxes and planters. Wood, with the exception of redwood or cedar, will need to be treated with a preservative. Join pieces together with brass screws and a good quality wood glue. The shape can be determined by the skill and patience of the builder: cube, rectangular, tapered sides, etc.

1. Many homes include a permanent planter of brick, wood, or concrete. To build such a planter lay out the line to be followed on the ground, dig a trench 18 inches deep, 6 inches wider than the wall and fill with concrete. When set up, install the brick until it is the desired height; at this time it is capped. Such planters can be rectangular, square, triangular or circular. They can even be built around trees or posts.
2. To fully enjoy pendulous or trailing plants, show them at or above eye-level in hanging baskets. They can be constructed from wire or wood. Square and hexagonal shapes are appropriate. Suspended with a wire, chain or rope, they lend class to a garden setting.
3. Sawed-off kegs or barrels painted a dark color can be successfully used to grow plants.

IV. Storage Facilities and Shelters

A gardener needs an efficient storage space in the garden. In this area should be a specific space reserved for each tool or implement on hand. If the space is large enough it can also hold such items as fertilizer, peat moss, charcoal for the barbecue, etc.

A. Local lumber and building supply dealers may have prefabricated sheds on display for sale. There are also prefabricated sheds of steel or aluminum which are generally less expensive.

B. For a person who is reasonably handy with tools it is not too big a project to make a small shed or building for garden storage. One simple way is to add three walls and a roof to the side of an existing building.

C. A solid fence can serve as the back wall for a closed storage space. The addition of a roof and three sides faced with the same material as was used for the fence and the storage space becomes a subtle extension of the fence.

D. For a person who spends a great deal of time outdoors and has the space and resources a garden shelter may be used. Such a shelter is usually detached from the main building and can be used for a number of things, such as a place to meditate or a place to putter around with potted plants. The shelter may be a lathhouse, gazebo, pergola or the like.

   1. The lathhouse is a framework covered with laths spaced a short distance apart. This would be an ideal place for summering shade-loving house plants.
   2. A gazebo is typically a 6 or 8-sided structure with a peaked roof. It is difficult to construct but does possess charm and old-world flavor.
   3. A pergola is a passageway usually consisting of a wooden frame with living plants such as a grape wine or wisteria vine providing shade.
   4. A canvas shelter can be used as an effective and handsome structure. A pipe framing works well and can be one of many designs.

V. Garden Lighting

This aspect is today within the means of most homeowners thanks to the low-voltage lighting systems. Conventional 120-volt lighting is a job for a qualified electrician.

A. Low-voltage wiring is an easier answer to outdoor lighting and is one than can be done by the

[redacted]

handyman. With this system, a simple transformer that plugs into any outlet reduces the normal 120 volts to 12 volts. The 12-volt cables can be placed just one inch below the soil surface. With a spade wedge the earth apart, put the cable in place, and tamp the soil down. If the cable is accidentally cut with a spade, there will be a spark but no shock. Low-voltage light is a soft light and is excellent along flower beds, walks, paths and steps. The system comes in kits containing a transformer, a number of lights, and adequate cable. For lighting large areas such as the lawn or patio, a person will still need the conventional 120-volt lighting system.

An attractive garden, properly lighted, can be a breathtaking scene at night. Every element takes on a new dimension when properly illuminated. In addition to adding to the beauty, lighting is necessary for safety too. For the person interested in this aspect of home beautification, here are some hints.

1. The fixtures, whenever possible, should be placed so they are hidden from view.
2. Select a focal point such as a tree or some garden ornament. Make the light brighter in this area.
3. Keep the intensity at different levels throughout the garden.
4. Strive to bring out shadows, textures and contours. This can probably best be accomplished by the trial-and-error method at night. Use walls and fences as reflecting surfaces.
5. Direct a light source at a wall, fence, or shrubbery behind a plant or object to form a silhouette of that object.
6. The texture of an architectural object, tree bark or masonry wall can be emphasized by aiming the light source parallel to the surface of that object.
7. Aim some lights at one object from several directions to give a three-dimensional effect.

8. Colored lighting can be used to emphasize the color of an object or plant. Use the same color as the object illuminated.
9. In some instances the light itself can be used as a substitute for plants in order to fill spaces with light and shadow rather than foliage.

B. A finishing touch on lighting can be supplied by a more primitive source - candles. Clear glass chimneys from lanterns can serve as a container and shield. Glass jars can be used for a similar effect. Ceramic containers are also easily adapted.

C. Flare pots can be attractive beside the pool or on the patio.

D. Gas lanterns are also popular garden lighting subjects. They are widely used for adapting antiques into lighting containers.

VI. Greenhouses and other Plant-Growing Structures

A greenhouse may be in the picture for the real plant enthusiast.

A. A south or southeast exposure is the most favorable location. Other exposures can be acceptable but may restrict the choices of plants that can be grown.

B. The small hobby greenhouse can be freestanding (not attached to any other building) or lean-to (the wall of another building serves as a support). Numerous styles of greenhouses are available for the hobbyist. The decision may be for an even-span house, octagonal, A-frame, quonset, gothic arch or other styles.

C. Regardless of the style chosen for the greenhouse it must rest on a foundation. For best results this should extend into the ground to below the frost level.

D. In providing a favorable environment for growing the plants, provision will need to be made for heating, ventilation, and cooling. The most convenient solution is automatic controls. Manually controlled units may be used if someone is present to operate them when needed.

E. The greenhouse can be covered with glass, fiberglass or rigid plastics. Plastic film can also be used as a greenhouse covering, however, a person should keep in mind that it will need replacing frequently and may not look as attractive.

F. Prefabricated greenhouses are readily available. They come in practically any size or shape and are relatively easy to assemble.

G. A coldframe has many uses for the home gardener: starting seed, hardening plants before full outdoor exposure, starting cuttings of plants, as well as carrying plants over the winter in a protected place. Essentially a coldframe is a bottomless box with a sloping top of glass or plastic. It should be located in a protected place with the high side to the north so as to receive the greatest benefit from the light. A good size is 3 x 6 feet; however, they can be any size. Ready-made coldframes are available and are easily set in place.

H. Hotbeds are like coldframes except they have artificial heat. This is usually supplied by thermostatically controlled heating cables. Since artificial heat is being supplied, it is of utmost importance that the structure be constructed substantially and thoroughly insulated.

VII. Pools and Water Gardens

A. Nothing puts the finishing touch on a garden quite like a pool. They can be constructed to fit a variety of situations and do not have to be large and complicated. A pool can be supplied with something as ordinary and simple as a tub.

B. When the pool is constructed of concrete, the sides should be sloped to throw off the grip of the water as it freezes. Dig the hole wider and deeper than the ultimate size. Fill with a layer of gravel or cinders 4 - 6 inches thick. Cover with concrete 4 - 6 inches thick. An overflow pipe and drain are almost a necessity for a pool of any depth.

C. Where only a reflecting pool is desired, this can be accomplished with a pool as shallow as eight inches deep.

D. The sound of moving water in the garden is soothing and relaxing. This can be brought about by means of recirculating pumps made especially for this purpose. This can be developed into a fountain or a cascade (waterfall).

E. For added interest and fascination water lilies and goldfish can be established in the pool.

F. Fiberglass pools of various shapes and sizes are available from nurseries and water garden specialists. With careful use of rocks and plants they can be successfully integrated with the surroundings.

G. Small prefabricated dishes and bowls are inexpensive, are available in many sizes and are easily installed. They may be made of metal, plastic, fiberglass, or concrete aggregate. Generally they are not large enough to grow plants, thus they become a water accent rather than a water garden.

H. Old barrels make satsifactory water gardens in which plants can be grown. They can be sunken in the ground or set on top.

VIII. Barbecue

A. For the family that enjoys entertaining outside or just family cookouts, a barbecue may be constructed. One plan consists of building a poured concrete base 3 feet 4 inches wide by 4 feet long. After the concrete has hardened, then start laying the block (or any other material which may be used, such as brick or stone).

B. When a permanent barbecue facility is not practical, a person can choose a portable grill available in a wide variety of businesses. There is an extremely large choice of styles available.

IX. Working with Basic Construction Materials

A. Wood

1. The three woods most resistant to decay are redwood, cypress, and red cedar.
2. Plywood used for outside projects should be "exterior" or "marine" grade.

B. Concrete

1. When concrete is laid so as to adjoin existing masonry such as a sidewalk, steps or the like, an expansion joint is required between the old and the new work. This is simply an asphalt-impregnated fibrous material installed in the joint between the old and new work. In a concrete walk or driveway such a joint should be installed approximately every ten feet.
2. In finishing concrete use a steel trowel if a very smooth finish is desired. (This usually results in a surface unsatisfactory for outside, as it is very slick when wet.) A flat wood trowel will give a more satisfactory surface.
3. After floating with the trowel a person can make for safer footing in wet weather by pulling a soft-bristled push broom across the concrete. This gives the surface more texture.
4. Exposed aggregate is an extremely good-looking finish. When the newly poured concrete begins to firm up, gently hose and brush away the surface, exposing the stones. Special, attractive stones must be used; it may be desirable to hire a craftsman to do this work.
5. Do not pour concrete in freezing weather.
6. After concrete is poured it should be kept moist for a period of at least 3 to 6 days; 2 weeks is even better.

C. Brick and Concrete Block

1. Brick can be laid on sand to serve as a walk, patio, etc. Strip the sod, remove stones, roots and any other foreign matter. Cover with two inches of sand. If the soil is slow-draining, use one to two inches of crushed stone followed by two inches of sand. Lay the bricks closely together on the bed of sand. Sweep **sand** into the joints, spray with a water hose to pack down the sand. Repeat the process of sweeping sand into the joints and spraying until all joints are tightly packed.
2. Brick can also be laid in mortar. For this job a concrete slab is poured and the bricks mortared in on top.
3. With normal traffic and weather brick paving will eventually spread at the edges. For this reason an edging should be installed. A row of brick can be mortared in to serve as edging. Also redwood boards can be used as well as flat steel.
4. As for building a structure such as a wall of brick a person should first consider his own ability. A garden wall or retaining wall six feet high should be built by a professional. However there are several jobs that can be done by the amateur. These jobs include low garden walls, bench piers, tree wells and outdoor projects. With any brick wall a foundation is needed. It should extend underground below the frost line. It should be half again as wide at the base as the width of the wall itself.

NOTE: For more detailed plans refer to references used with this lesson, especially reference number 4 and reference number 6.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher.

1. Some kinds of structures are used in every landscape.

   2. All structures have size, form, color, and texture and as a result influence the unity and harmony of the landscape.
   3. Many structures can be built or installed by the "do-it-yourselfer." However, this person should realize his own abilities and recognize the fact that some projects are best left to the professional. One such example is the installation of an in-the-ground swimming pool.

B. Things to be brought out by the class members
   1. Original ideas for projects
   2. Their experience in working on projects

II. Conclusions

A. Construction materials such as stone, wood, and concrete should blend with the main buildings.

B. The use of small structures such as lawn ornaments can be overdone. They should be chosen with care and good taste.

C. Wood used for construction should be redwood, cedar, or cypress if permanence is desired. Other wood, such as pine, may be satisfactory if care is taken to see that it is kept painted and inspected regularly for decay. If pine is to be in contact with the ground it should be pressure-treated.

III. Enrichment Activities

A. A class tour to study landscape structures such as walk, drives, steps, patios, planters, etc.

B. A discussion with a construction contractor in relation to basic skills and materials to use.

C. Make a collection of original ideas for projects that can be used in the garden. Some excellent sources are magazines and newspapers.

D. A visit to a garden center to observe objects offered for sale.

IV. Suggested Teaching Materials

A. References for Lesson 4

1. Approved Practices in Beautifying The Home Grounds, pp. 221-243.
2. Better Homes and Gardens New Garden Book
3. Betty Ajay's Guide To Home Landscaping by Betty Ajay
4. Gardening and Home Landscaping by Jack Kramer, pp. 185-218; 237-276.
5. Greenhouse Gardening for Fun by Claire L. Blake
6. Landscaping and the Small Garden by Marjorie Diety
7. Landscape Design, A Teacher's Manual, The Pennsylvania State University, pp. 63-81.
8. Landscaping Your Home by William R. Nelson, Jr., pp. 29-46.
9. Reader's Digest Practical Guide to Home Landscaping, pp. 177-195; 308-459.
10. Minimum Maintenance Gardening Handbook by Walter F. Bruning, pp. 206-256.
11. Patios, Terraces, Decks, and Roof Gardens by Alice Upham Smith, L.A., pp. 15-83; 120-173.
12. The Complete Gardener by Lois Wilson, pp. 102-123.
13. The Outdoor How to Build it Book by Robert Lee Behme, pp. 1-237.
14. Water Gardening by Jack Kramer

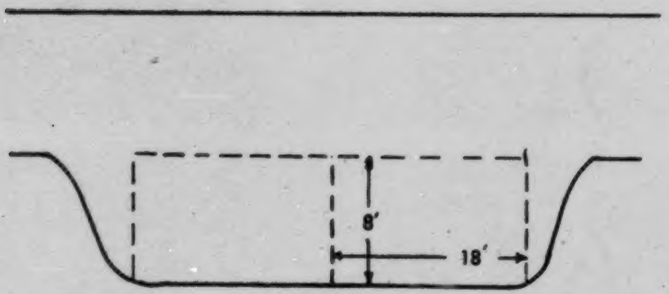
B. Resource Personnel

1. Consult local sources
2. Extension horticultural specialists
3. For specific personnel consult VoAg Directory of Resource People in Kentucky

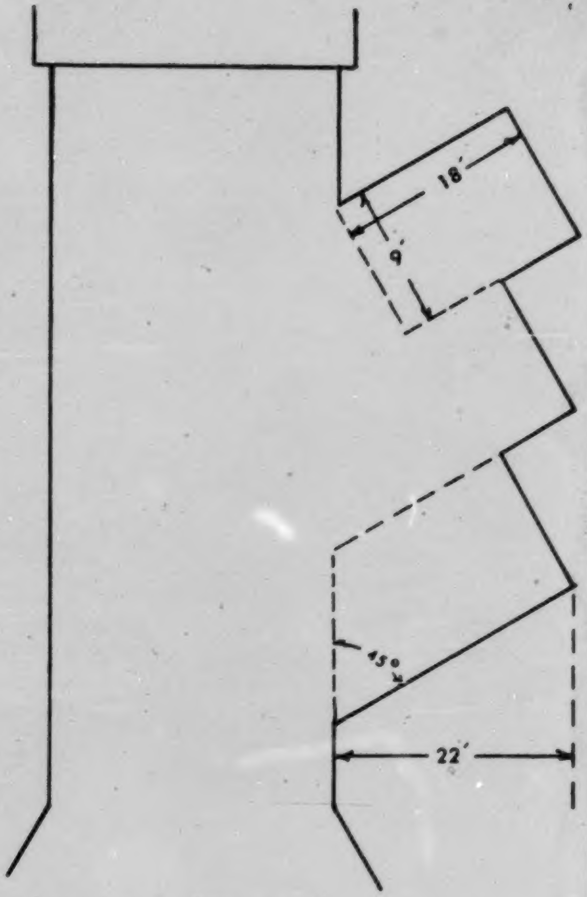
C. Audio-Visuals

1. Masters
    - -1 Parking Patterns
    - -2 Patio Patterns
    - -3A-D Paving Patterns

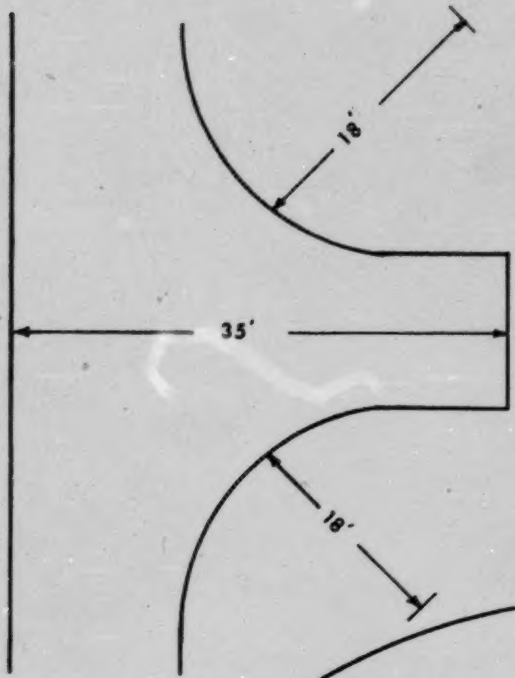
NOTE: Consult Greenhouse Management unit for transparencies on structures.



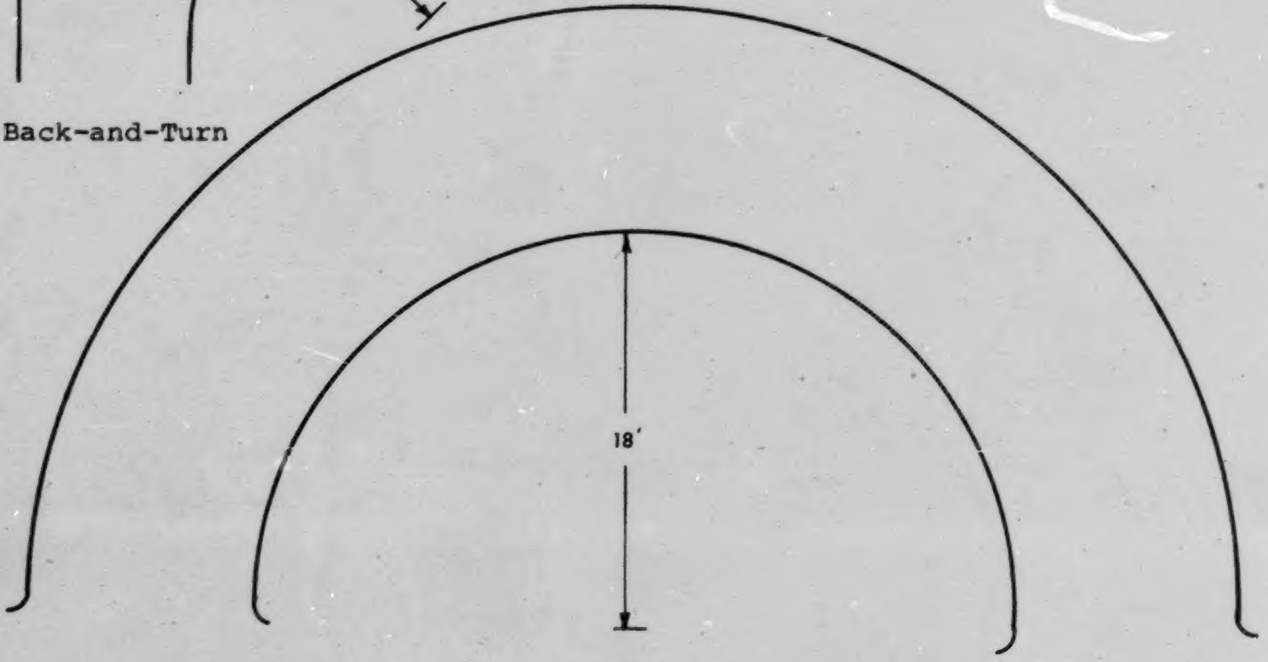
Parallel Parking



Saw-Tooth Parking

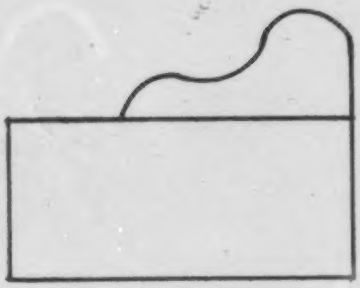


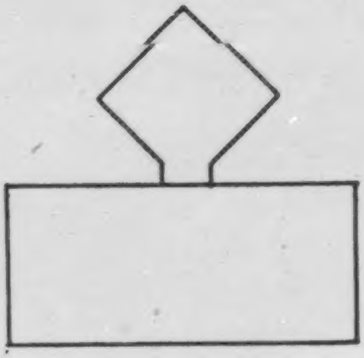
Back-and-Turn

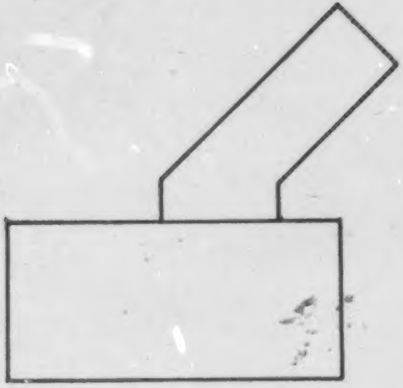


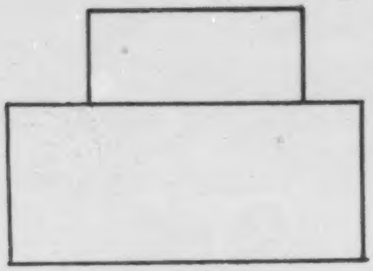
Circular Drive

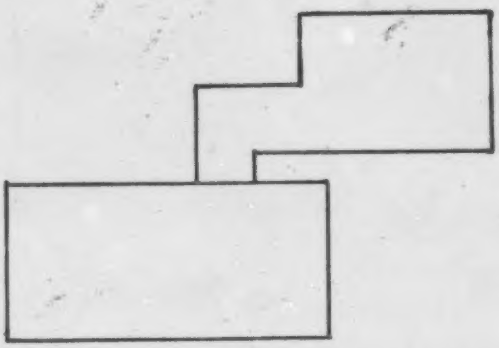
PATIO PATTERNS

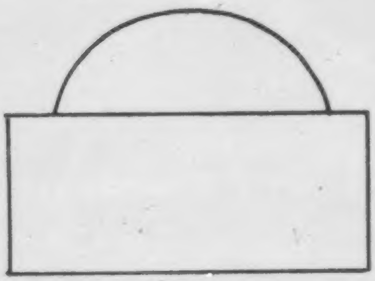




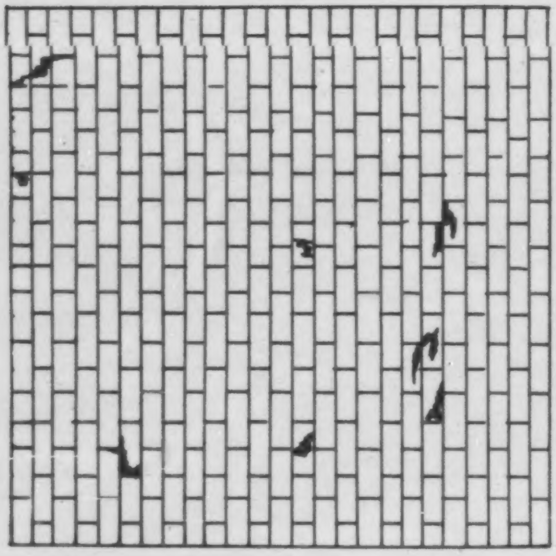




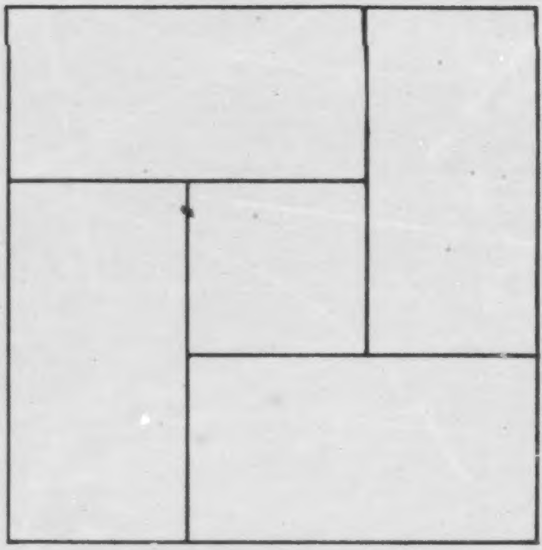




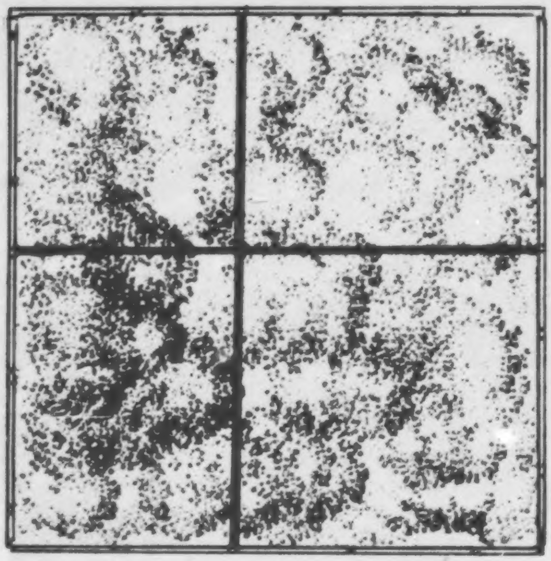
PAVING MATERIALS



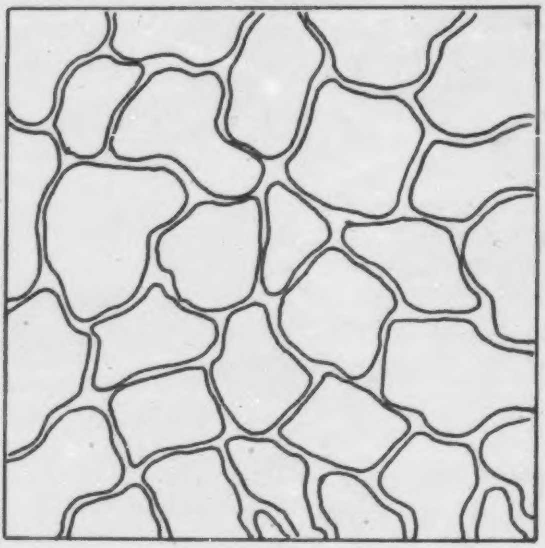
Brick



Patio Blocks



Pebbles in Concrete



Flagstone

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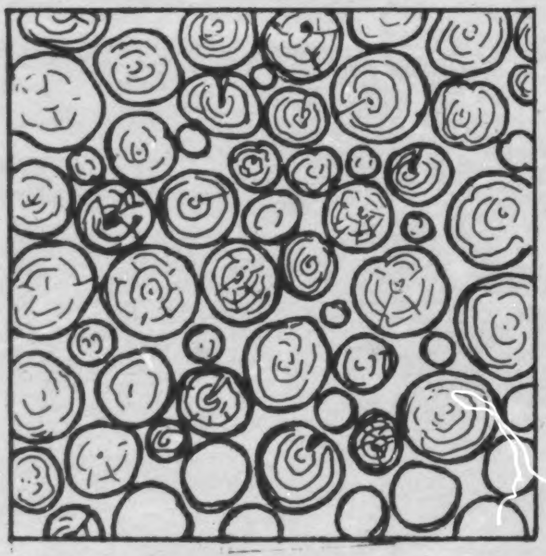
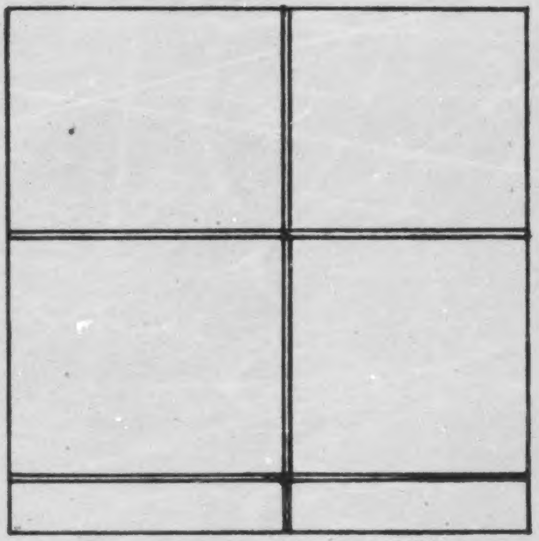
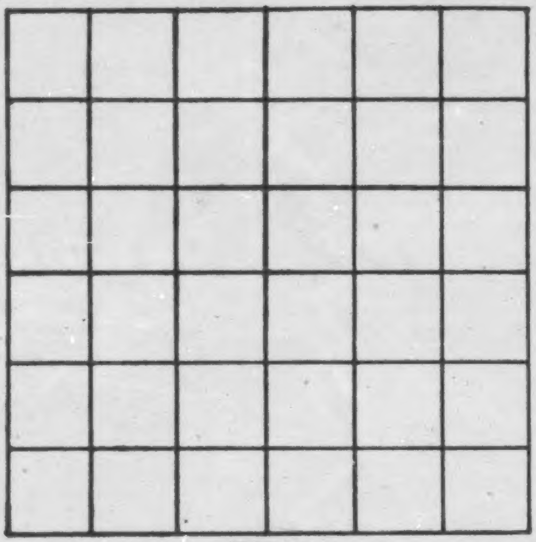

Wood rounds


Concrete with redwood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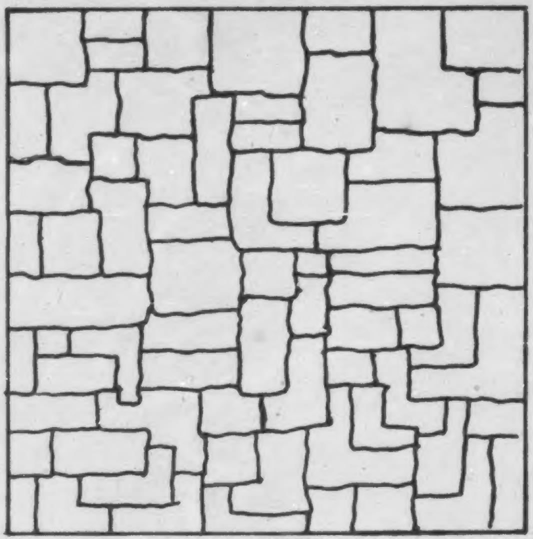
Slate

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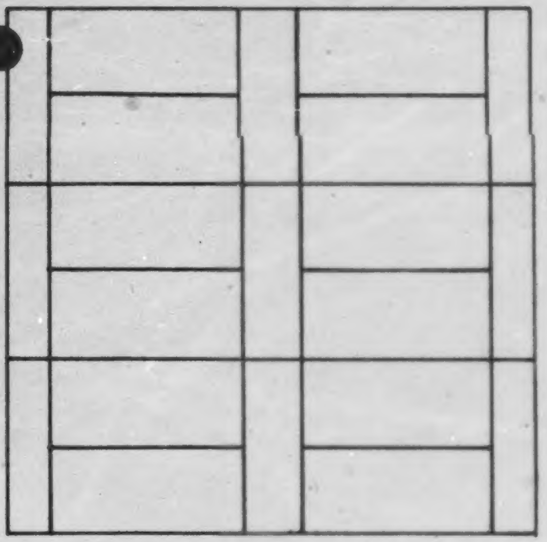
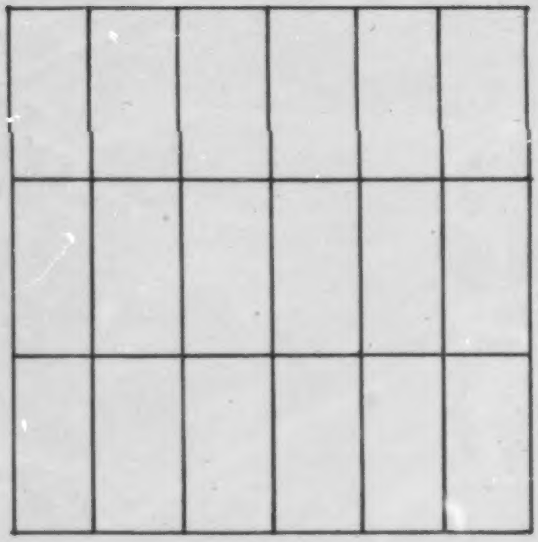
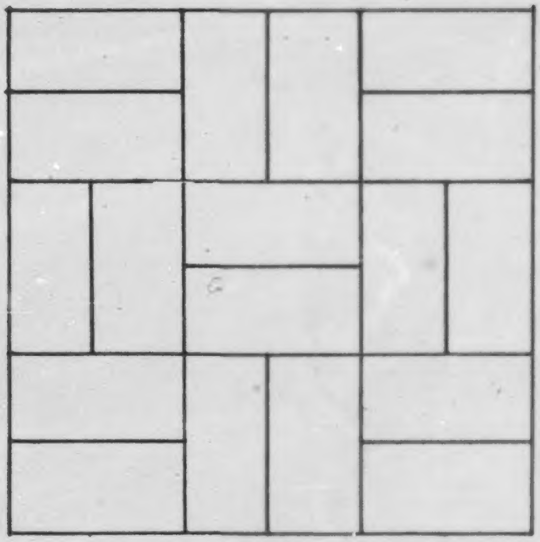


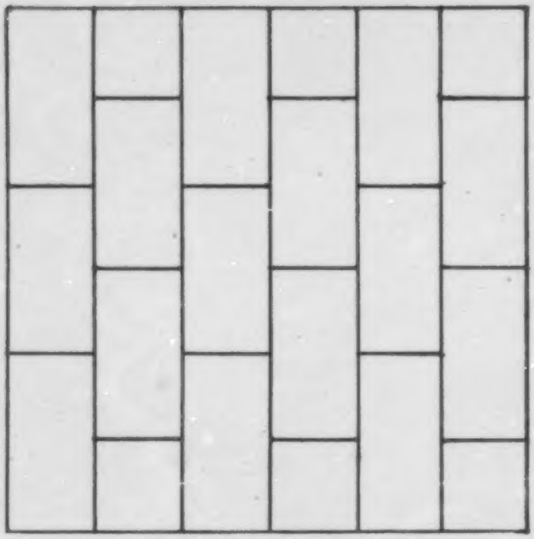
Ladder



Plain

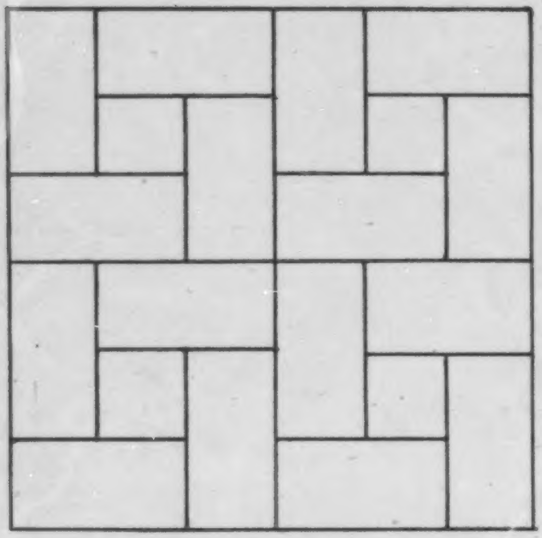


Basket Weave

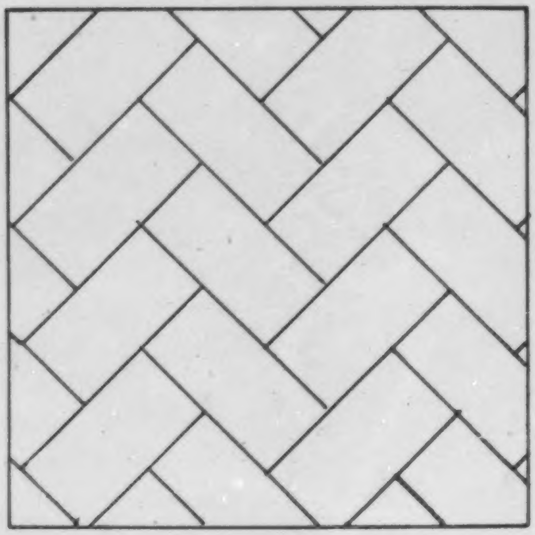


Blocky

PAVING PATTERNS



Spanish



Herringbone

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Lesson 5

ESTABLISHING ORNAMENTAL PLANTS

Objective -- To develop the effective ability of homeowners to properly establish ornamental plants.

Problem and Analysis -- How can we properly establish ornamental plants?

-Securing ornamental plants
-Spacing trees and shrubs
-Time to transplant
-Transplanting trees and shrubs
-Care after transplanting

Content

I. Securing Ornamental Plants

  A. The first recommendation is to secure all plants from a reliable nursery.
    1. To go even further, it is beneficial to purchase plants that have been locally grown because locally grown plants are adapted to the climate.
    2. If not available locally, a person has no other choice than to look elsewhere.
      a. There are a large number of reputable and reliable mail-order nurseries which publish well-illustrated catalogs.
      b. Check to see that the one being considered is a member of the American Nurseryman's Association, and will back up his plants with a guarantee.

  B. Plant material will be sold in one of three ways:
    1. Balled and burlapped plants. These are commonly referred to as "B & B". They are dug with a ball of soil around their roots

and this ball is tightly wrapped with burlap. Large trees can be successfully moved "B & B" by experienced personnel.

2. Bare root plants.
    a. These are plants with the soil removed from the roots.
    b. Plants purchased from a mail order house will be shipped in this manner, wrapped in protective material such as sphagnum moss or plastic.
    c. Bare-root plants are usually less expensive and can be planted only when they are dormant.
    d. These roots must never be permitted to dry out.
    e. Evergreens should not be purchased bare root.
3. Container stock. Many plants, both evergreen and deciduous, are sold in containers. This method seems to be gaining in popularity.

C. One of the factors that will determine the quality and grade of nursery stock is the size.
  1. The height of deciduous shrubs is usually expressed in inches up to 24 inches. For plants taller than this, the height is usually stated in feet.
  2. The measurements of evergreen shrubs depends upon the type selected.
      a. Measurements for spreading types give the spread, not height.
      b. For upright types, the height is usually expressed in inches up to 24 inches and in feet when taller.
  3. Tree measurements are given in feet tall (mostly for smaller trees) or caliber measurements.
      a. Caliber refers to the diameter of the trunk 6 inches above the ground for those whose caliber is 4 inches and under.
      b. For those with a caliber over 4 inches, the measurement is made 12 inches above the ground.

D. A possible source of ornamental plants, especially trees, is from an area where they grow wild.
  1. Keep in mind that it is extremely difficult to transplant a wild tree successfully.
    a. Native trees collected from the wild are often spindly and misshapen.
    b. If at all possible, try to select trees growing in an open area, as such trees are more likely to be well developed.
  2. Select healthy, vigorous plants that are of the natural shape for that species.
  3. Trees of any size will need to be root pruned at least one year prior to transplanting.
    a. To root prune, mark a circle around the plant and dig into the soil on the outside of this circle. Dig down well beneath the root mass.
    b. Better luck will be obtained with shallow-rooted trees such as maples, than with deep-rooted trees such as dogwood or oak.

E. Collect native shrubs from the wild only if they fit the landscape situation. In a deciduous shrub, height is not as important as the number of stems.

F. Friends, relatives and neighbors offering surplus plants are another good source.
  1. However, the offer of such plants should be declined if they do not fit into the landscape plan.
  2. After putting work into developing a landscape plan, a person must discipline himself to follow it through.

G. Select shrubs with a large number of stems that branch out from the main portion close to the ground.
  1. Look for leaves free of blemishes or with a lot of buds on the branches.
    a. Pay particular attention to signs of disease or injury which may be indicated by shriveled bark, dead twigs, or brown leaves.

b. Dark spots on the leaves may indicate a fungus disease; holes should mean insects.

2. Hold a piece of white paper under the leaves and shake the plant.
    a. Spider or other mites are present if tiny dots start dancing on the paper.
    b. If such is the case the plant should be passed up.
3. Cankers, malformations on the stems that resemble dark knots, may be another reason for rejecting a plant, as they cut off the flow of sap and may spread eventually killing the entire plant.

H. Reject trees with the following problems:
1. Broken branches or injured bark--signs of improper handling.
2. If in leaf, reject any with wilted leaves--a sign of improper watering or a poor root system.
3. Pass up trees with leaves smaller than standard for that species--another indication of a poor root system.
4. A vigorous tree will have leaves of a healthy green color--a color unmistakable to most anyone.
5. The ball of soil around the roots should feel tightly packed and hard--an indication that roots are not broken or loose or air pockets present.

I. The best tree to transplant should be 1½ to 3 inches in diameter, 8 to 12 feet tall, have a well developed top, properly shaped with a compact, well-branched root system.

II. Spacing Trees and Shrubs

A. Large shade trees should be spaced 40 to 60 feet apart, 15 feet from buildings, and 5 feet from walks. This may be modified for a special effect.

B. Small trees can be spaced differently, depending upon the desired effect. Generally, they should be placed 6 to 8 feet from a building.

C. Shrubs that mature at a height of 4 to 5 feet should usually be 2 feet from a wall, 4 feet apart, and 3 feet from a drive, walk or lawn edge.

D. With a mature height of 6 to 8 feet the shrubs should be placed 3 feet from a wall, 5 feet apart, and 4 feet from a drive, walk or lawn edge.

E. Shrubs with a mature height of 8 to 15 feet should be placed 4 feet from a wall, 6 feet apart, and 5 feet from a drive, walk or lawn edge.

III. Time to Transplant

A. Shrubs that are balled and burlapped or grown in containers may be successfully planted practically any time that the soil is workable. The preferred time is spring or fall. The fall planting season for balled and burlapped plants actually starts in late summer.

B. An advantage to spring planting is that the plant has several months in which to become established before the extremes of winter arrive.

C. Fall is more apt to find the soil easy to dig (moist instead of muddy). The soil is warm which encourages root growth until the ground freezes.

D. Bare-root plants are successfully transplanted only when dormant. Due to the ground being frozen in winter they can be planted only in the fall or spring. In the fall this means the leaves drop. Spring means just before plants leaf out.

E. Plants with thin bark should not be planted in the fall, because they may not withstand winter drying. This is especially true for dogwood and birch.

IV. Transplanting Trees and Shrubs

A. Trees

1. In order to determine the size of the ball of earth, a good guide to follow is to make the ball one foot in diameter for each inch of tree-trunk diameter taken about a foot above the ground.
2. The place where the plants are to be set will be identified far enough ahead of time to supply any needed amendments, such as organic matter. In the case of evergreens, especially azaleas and rhododendrons, the soil may need to be more acid. Sulfur or aluminum sulfate are two widely used products for this purpose.
3. Dig a hole twice the diameter of the root ball, or container, and one and one-half times the depth.
   - a. For bare-root plants the hole should be large enough so the roots can be spread out and not be crowded.
   - b. Mix peat moss, compost, or some other organic material into the soil in the bottom of the hole.
   - c. When the hole was dug, the topsoil and the subsoil should have been put into separate lots.
   - d. Mix the same organic material with the topsoil that was incorporated into the bottom of the planting hole. Add this material to the hole until it is as deep as the root ball.
4. Make sure the tree is placed at the same depth it grew in the nursery.
   - a. For balled and burlapped or container-grown plants, when the tree is placed in the hole at the correct depth it will touch the bottom of a board placed across the hole.
   - b. When at the proper depth add more topsoil mix and firm it well until it comes within 3 or 4 inches of the ground level. Fill the hole the rest of the way with water. When the water has drained through, add more topsoil mix to the ground level. With this same

mix build a 2-inch ridge around the base to hold water.

5. Mulch around the tree with peat moss, compost, rotted leaves, etc.
6. Keep in mind that B & B as well as bare-root stock has lost part of its root system in the transplanting. If the nurseryman has not already done so, the person will need to remove some of the top growth to compensate for this root growth (as much as 1/3 of the top growth may need to be removed). This does not mean remove 1/3 of each branch. Instead completely remove weak, poorly placed branches until enough have been removed to compensate for the root loss. Be extremely careful not to cut the top main stem, or central leader. Retain the natural shape of the tree. Some lower limbs may be completely removed also.
7. For at least the first two growing seasons in its new location, the tree will need support in the form of stakes and guy wires. Run the wire through a short section of garden hose where it contacts the tree trunk.
8. The tree trunk also needs protection from the strong wind and sun as well as from insects and rodents. This protection is afforded by a special tree wrap paper, wrapped around the young tree's trunk. Wrap from the ground to the crotch of the first major branches. The paper which expands as the tree grows should be kept on for two seasons and then removed.

B. Shrubs

1. Dig the hole for B & B or container-grown shrubs 6 to 12 inches wider than the ball of dirt. For bare-root plants, dig the hole large enough so the roots will not be crowded.
2. As with trees the subsoil portion of soil removed from the hole should be discarded. The topsoil portion should be mixed with large quantities of well decayed organic matter.

3. Place the shrub in the hole so that it will be at the same depth or slightly deeper than in the nursery.
    a. With B & B plants it will be no problem to tell this depth, which is the top of the root ball.
    b. With deciduous plants, examine the base of the stem for the soil-stain mark made at the growing level in the former location.
4. Gradually fill around the plant with the topsoil mixture. Firm this mixture down at frequent intervals.
5. When the hole is two-thirds filled with soil, fill the hole with water. When that disappears fill with water again. When the water has disappeared the second time finish filling the hole with the topsoil mixture. Do not tamp down after this filling. Leave a 2 inch depression around the plant to collect water.
6. For container-grown plants it is obvious that the plant must be removed from the container before transplanting. With B & B plants, do not remove the burlap - leave it intact. If it is tied with plastic twine the twine should be removed, but quit at this. The burlap will soon decay.

V. Care After Transplanting

A. Trees should be watered once a week after transplanting.
    1. If there is insufficient rainfall, then this must be done by hand watering.
    2. Care should be taken to see that the tree does not receive too much water.

B. Do not add commercial fertilizer until the tree has recovered from the transplanting operation.

C. Keep in mind that the branches on the tree do not get higher as the tree gets higher; therefore, remove the bottom branches to the desired height when the tree is small.

D. Newly planted evergreen shrubs also should be thoroughly soaked each week, at least through the first two growing seasons.

E. Evergreens have a shallow root system. For this reason, spread a mulch around such plants to conserve water and control weeds. Cultivating for this purpose may injure the roots.

F. Evergreens, on many occasions, are not pruned at planting time, except to remove dead or broken branches. If desired, such plants as junipers and taxus may be trimmed by cutting off the ends of the lateral branches.

G. All labels fastened to plants with wire or cord should be removed so as not to restrict the growth of that branch or stem.

H. As with deciduous trees, the deciduous shrubs should be pruned to compensate for the loss of roots.
   1. Be sure to keep the shrubs in their natural shape.
   2. Remove weak branches entirely as well as old and interfering branches.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher.
   1. After spending time to develop a landscape plan, a person needs to exercise great care to see that the plants are transplanted properly.
   2. Proper spacing will partially determine if the individual plants will ever mature into their natural size and form.
   3. The selection of healthy plants, free from insects and disease, will be more rewarding; healthy plants respond better after transplanting.
   4. The old adage "dig a $10 hole for a $5 plant" is sound advice in any situation.

5. The job is not completed when the plants are in the ground They require care as to watering, etc., at least until they recover from transplanting.

B. Things to be brought out by the class members.
   1. Personal experiences in selecting and transplanting ornamental plants.
   2. Successes and/or problems in transplanting at different seasons of the year, especially fall and spring.

II. Conclusions

A. Plants selected should be healthy and representative of the particular species in all respects, such as shape, color, etc.

B. Local nurseries, as well as reliable mail-order nurseries, are excellent sources of plants.

C. The site must be prepared so the plant will be set out at the same depth at which it formerly grew, without crowding the roots.

D. Attention must be given to every detail, such as mixing organic matter into the soil and watering thoroughly.

E. In trees, sometimes a smaller tree may be more satisfactory than an extremely large one. The transplanting is less of a shock and growth resumes faster than with a larger tree.

III. Enrichment Activities

A. Visit a newly landscaped home to observe such factors as spacing, bracing etc.

B. Provide practice in the following:
   1. Root-pruning a larger plant as preparation for moving at a future date.
   2. Digging the hole and transplanting a tree or shrub.
   3. Staking and taping a tree.
   4. Wrapping a tree trunk with tree wrap paper.
   5. Pruning the top growth to compensate for roots lost during digging.

IV. Suggested Teaching Materials

A. References for Lesson 5

1. Approved Practices in Beautifying The Home Grounds, pp. 151-179.
2. Better Homes and Gardens New Garden Book, pp. 96-97, 126-127, 130, 142-144.
3. Evergreens, Time-Life Book, pp. 19-31.
4. Flowering Shrubs, Time-Life Book, pp. 35-52.
5. Landscaping Your Home by Wm. R. Nelson, Jr., pp. 113-120.
6. Reader's Digest Practical Guide To Home Landscaping, pp. 299-300.
7. Shrubs For the Home Grounds, Correspondence Course No. 137, The Penn State University, pp. 8-12.
8. Starting The Home Landscape, Unit HS 82, U of K. Lesson 4 and 5.
9. The Complete Gardener by Lois Wilson, pp. 180-186; 193-195, 202-205, 219-223, 225-228.
10. Trees, Time-Life Book, pp. 25-33.
11. Trees For the Home Grounds, Correspondence Course No. 135, The Penn. State University, pp. 9-13.
12. Vines, Ground Covers and Espaliers, Correspondence Course No. 140, The Penn State University, pp. 6-7.

B. Resource Personnel

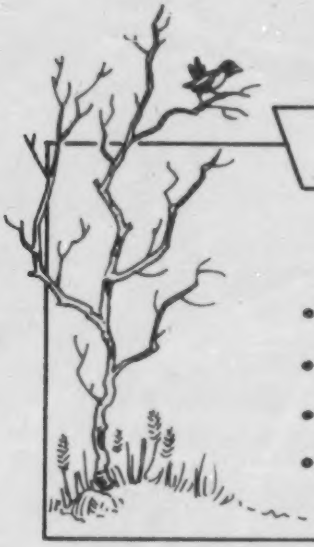
1. Extension Specialists
2. Local nurseryman
3. For specific personnel consult Vo-Ag Directory of Resource People in Kentucky.

C. Audio-Visuals

1. Masters
    - -1 Securing Shade Trees
    - -2 Spacing Trees
    - -3 Spacing Shrubs
    - -4 Time to Transplant Trees
    - -5 Time to Transplant Shrubs
    - -6 Size Tree to Transplant
    - -7AB Proper Placement of Balled and Bare-Root Plants in the Ground
    - -8 Transplanting the Tree
    - -9 Preparing Stock to Plant

-10 Setting Bare-Root Shrubs
-11 Planting Ground Covers
-12 Setting Hedge Plants
-13 Care After Transplanting

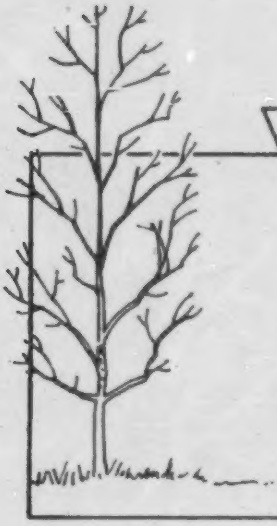
SECURING SHADE TREES



Native, Wild Trees....

Collected from wild conditions.

- Usually Poorly Shaped
- Usually Require Extra Good Handling
- Frequently Disease & Insect Contaminated
- Usually Make Slow Growth After Moving



Nursery Sources....

- Usually Well Shaped
- Usually Roots Have Been Pruned
- Usually Free of Disease & Insects
- Good Selection Usually Available
- Usually Make Good Growth After Moving

[redacted]

T. VANTREESE, INST. MATL. LAB., U.K.

SPACING TREES

OAK, ELM, MAPLE, ETC.

40-60 FT. Spacing

Do not plant closer than
15′ from house...
Or: 5′ from walks & drives.

LARGE TREES

DOGWOOD,
FLOWERING CHERRY, ETC.

20-30 FT. Spacing

Do not plant closer than
6′ to 8′ from house...
Or: 3′ from walks & drives.

SMALL TREES

Adult 110-5-2

[redacted]

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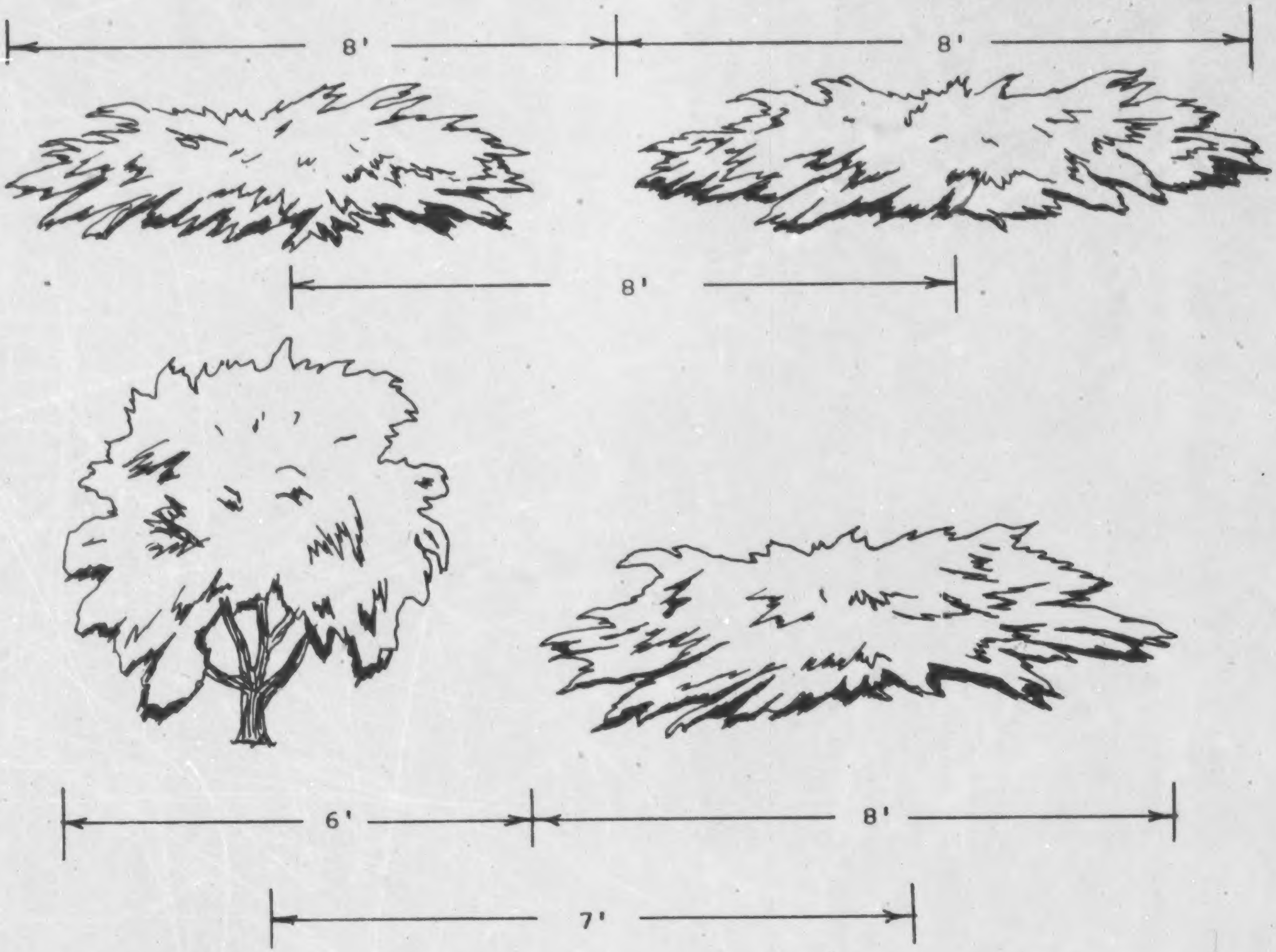
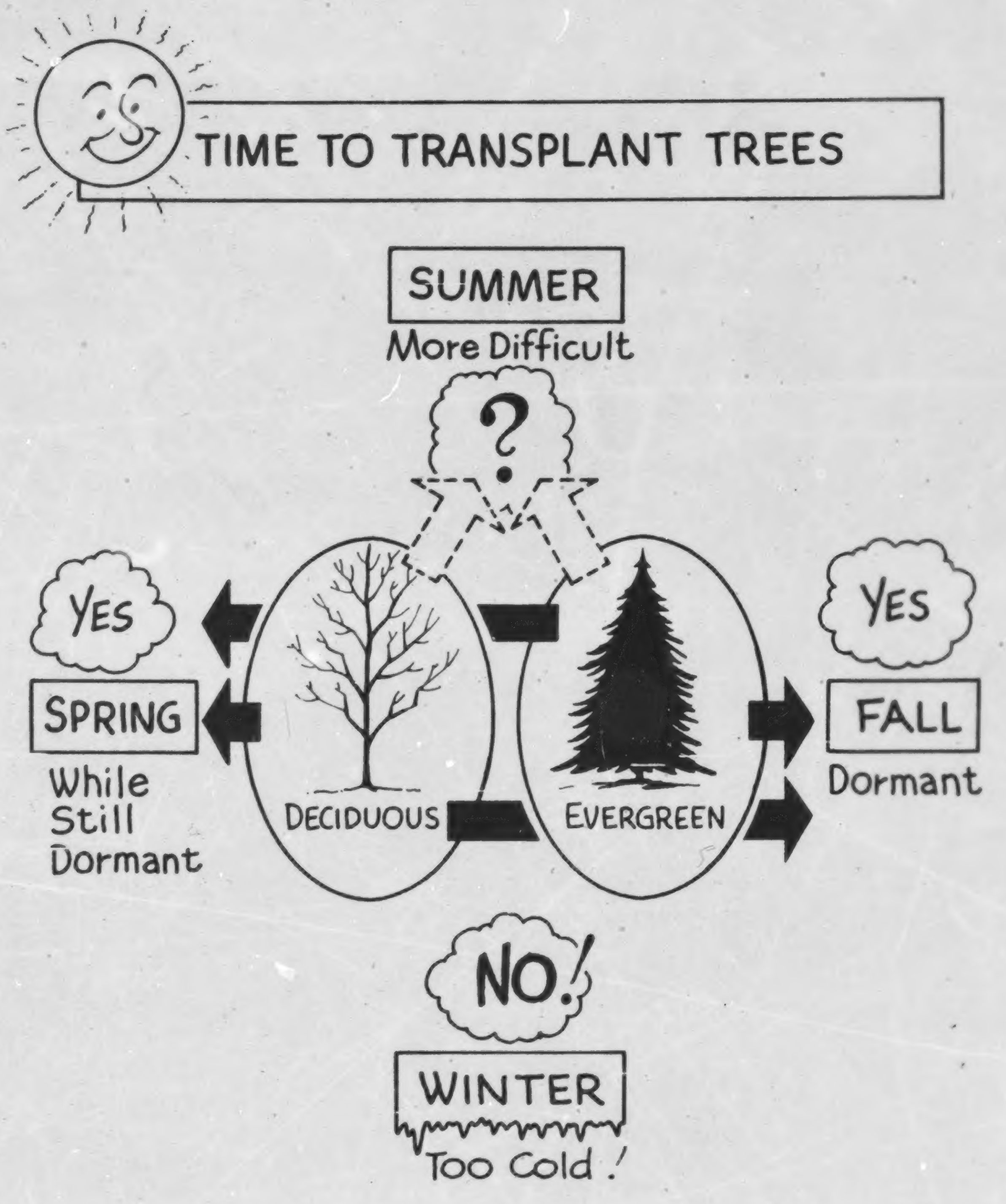
SPACING SHRUBS



Note: The distance from the center of one plant to the center of the next should be equal to 1/2 the mature spread of each plant.

Adult 110-5-3

S.STATZER.CURR.DEVE.CNTR.UK.10 81.7


TIME TO TRANSPLANT TREES
SUMMER
More Difficult
?
YES
SPRING
While Still Dormant
DECIDUOUS
EVERGREEN
YES
FALL
Dormant
NO!
WINTER
Too Cold!

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197
JAN
FEB
MAR
APR
MAY
JUN
JULY
AUG
SEP
OCT
NOV
DEC

TIME TO TRANSPLANT SHRUBS

DORMANT Period Best
(Spring or Fall)

DECIDUOUS Shrubs

Early Fall or Early Spring
Before GROWTH STARTS Again

EVERGREEN Shrubs

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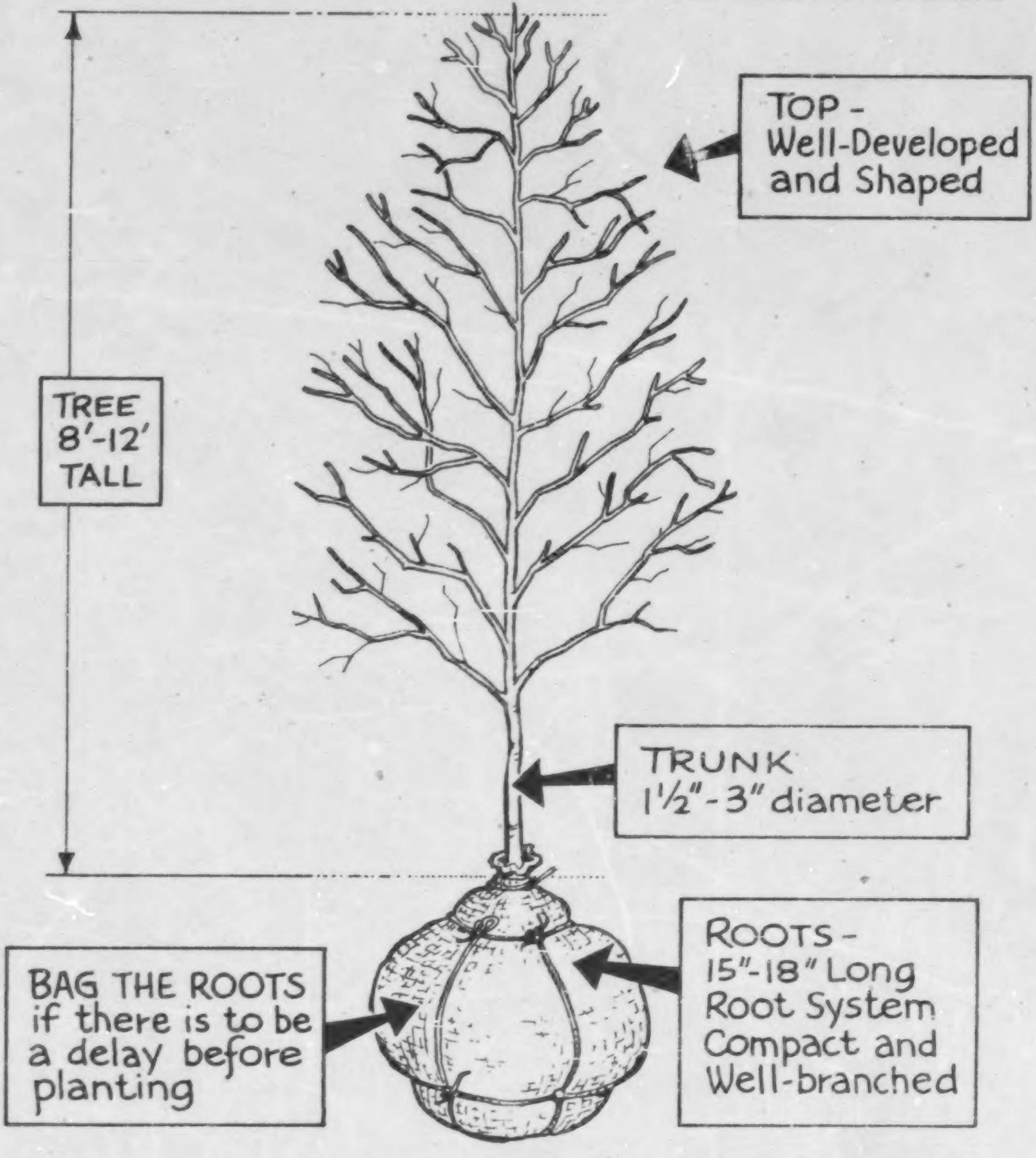
SIZE TREE TO TRANSPLANT



TREE
8'-12'
TALL

TOP -
Well-Developed
and Shaped

TRUNK
1½"-3" diameter

BAG THE ROOTS
if there is to be
a delay before
planting

ROOTS -
15"-18" Long
Root System
Compact and
Well-branched

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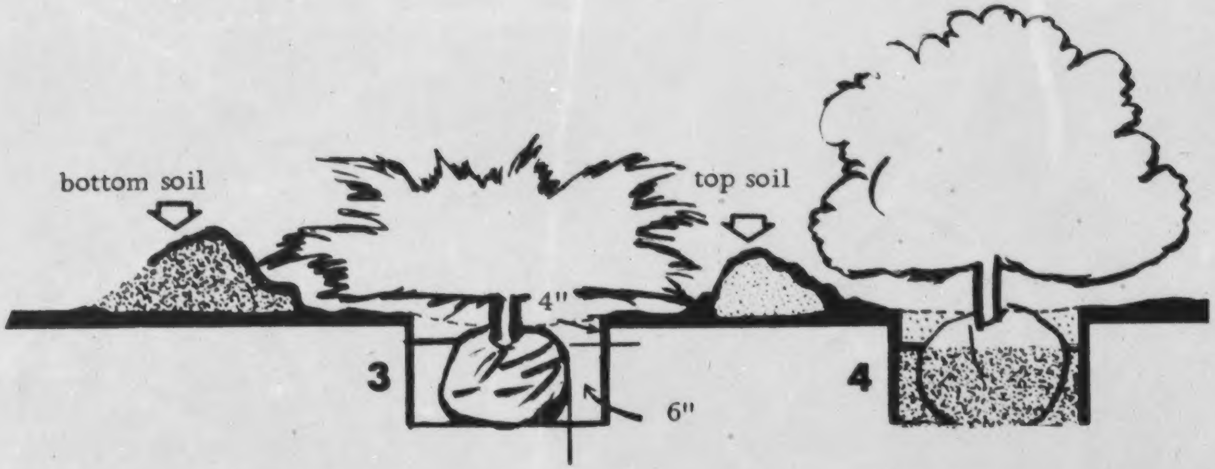
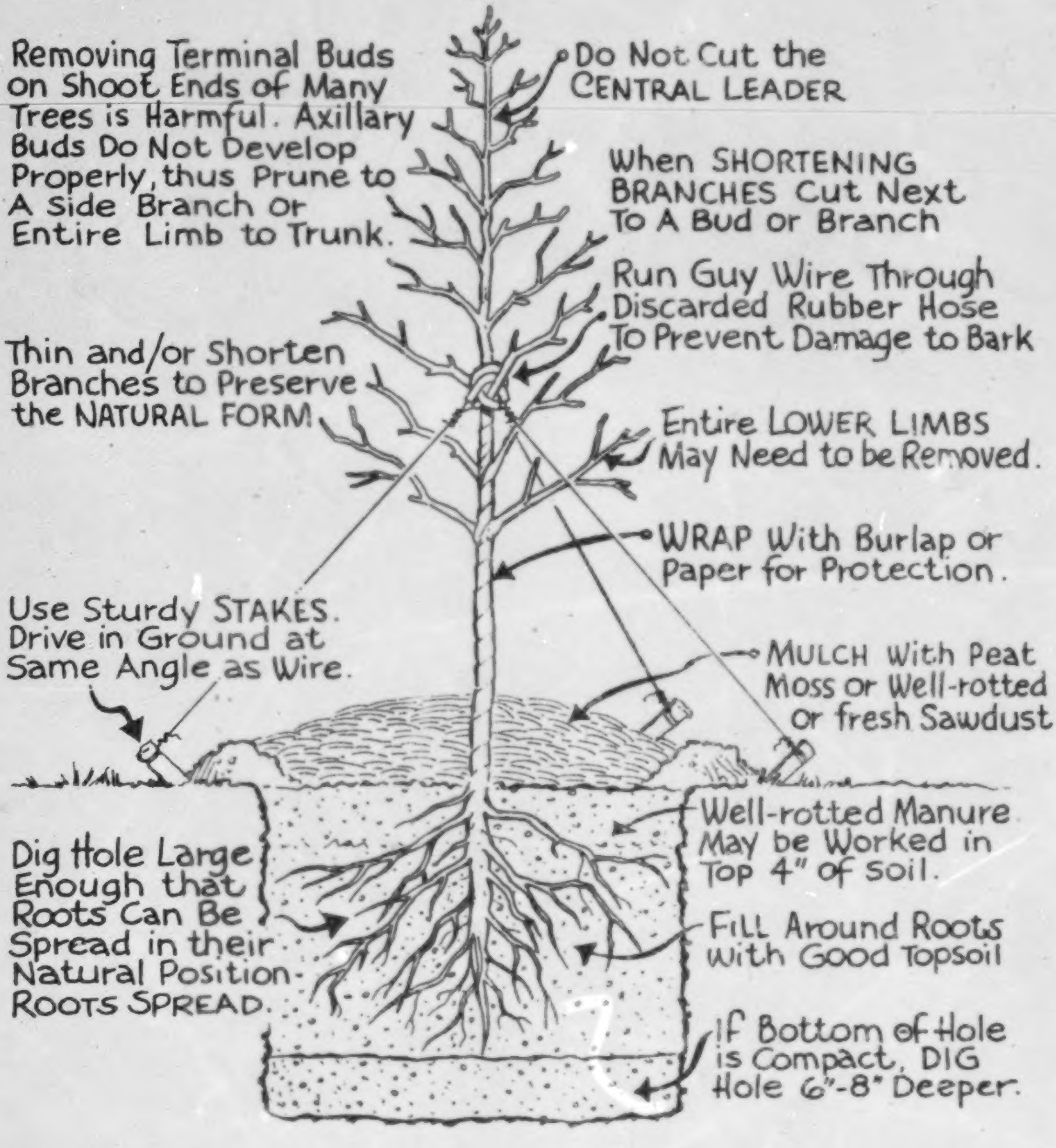
PROPER PLACEMENT OF SHRUBS


bottom soil
top soil
4"
3
6"
4

Source: Planting Evergreens on the Home Ground, UK leaflet 198-A.

Adult 110-5-7

TRANSPLANTING The TREE


Removing Terminal Buds on Shoot Ends of Many Trees is Harmful. Axillary Buds Do Not Develop Properly, thus Prune to A Side Branch or Entire Limb to Trunk.
Do Not Cut the CENTRAL LEADER
When SHORTENING BRANCHES Cut Next To A Bud or Branch
Run Guy Wire Through Discarded Rubber Hose To Prevent Damage to Bark
Thin and/or Shorten Branches to Preserve the NATURAL FORM
Entire LOWER LIMBS May Need to be Removed.
WRAP With Burlap or Paper for Protection.
Use Sturdy STAKES. Drive in Ground at Same Angle as Wire.
MULCH With Peat Moss or Well-rotted or fresh Sawdust
Well-rotted Manure May be Worked in Top 4" of Soil.
Dig Hole Large Enough that Roots Can Be Spread in their Natural Position - ROOTS SPREAD.
Fill Around Roots with Good Topsoil
If Bottom of Hole is Compact, DIG Hole 6"-8" Deeper.

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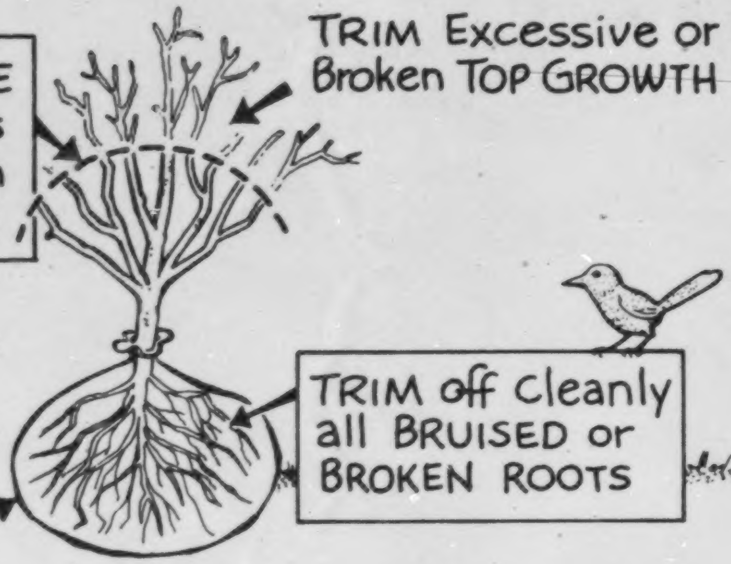
PREPARING STOCK TO PLANT



SEVERELY PRUNE TOPS of Shrubs Transplanted in Growing Season

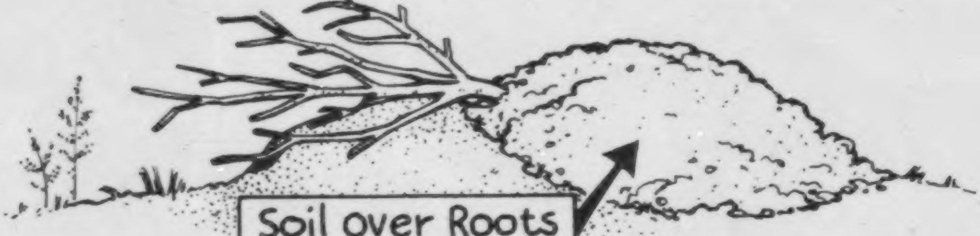
TRIM Excessive or Broken TOP GROWTH

PREVENT Roots from DRYING (cover -Burlap- Paper) Keep Roots Damp

TRIM off Cleanly all BRUISED or BROKEN ROOTS

IF DELAYED IN TRANSPLANTING...

- Store Shrubs in Damp Place
- "HEELED IN", Well Moistened



Soil over Roots Moistened

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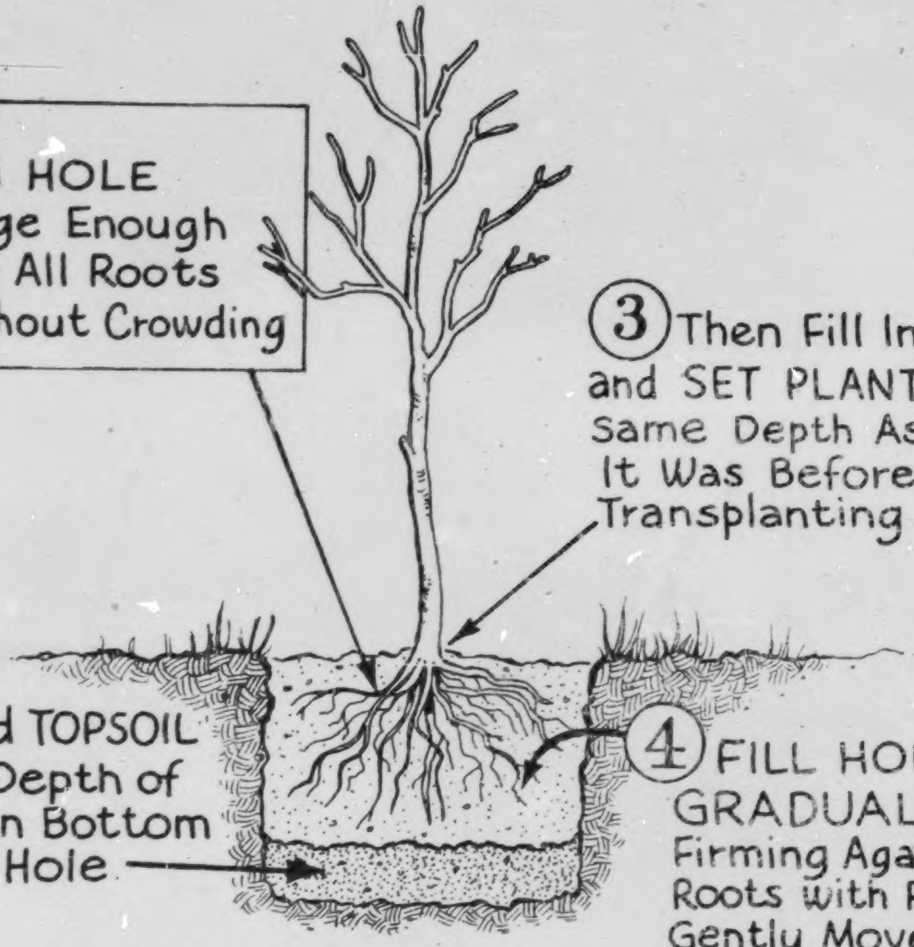
SETTING SHRUBS



① DIG HOLE Large Enough For All Roots Without Crowding

② Add TOPSOIL to Depth of 4" in Bottom of Hole

③ Then Fill In and SET PLANT Same Depth As It Was Before Transplanting.

④ FILL HOLE GRADUALLY Firming Against Roots with Foot. Gently Move Tree Up & Down As Soil is Added.

DECIDUOUS SHRUBS

T. VANTREESE INST. MATL. LAB., U.K.

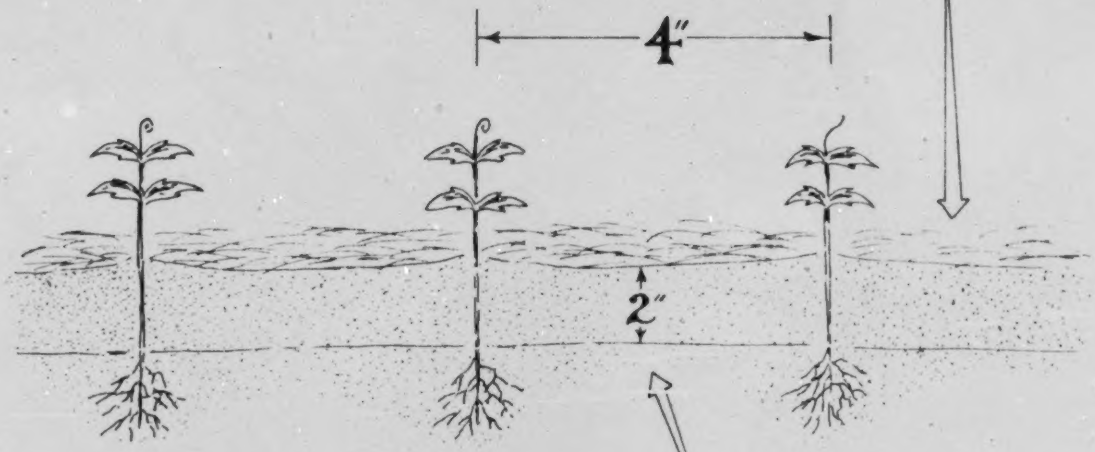
PLANTING GROUND COVERS

4\.
PLANT ONE PLANT EVERY
4 SQUARE FEET

3\.
SUPPLY 10-15 POUNDS
OF 10-10-10 FERTILIZER
PER 1000 SQUARE FT.

5\.
WATER REGULARLY

6\.
MULCH SURFACE
WELL (STRAW, ETC.)



2\.
PLANT GROUND COVERS
THROUGHOUT GROWING
SEASON – SPRING IS THE
BEST

1\.
ADD A 2" LAYER OF
ORGANIC MATTER
BEFORE PREPARING
SOIL

KEEP GROUND COVERS WELL WEEDED – (By Hand)

[redacted]

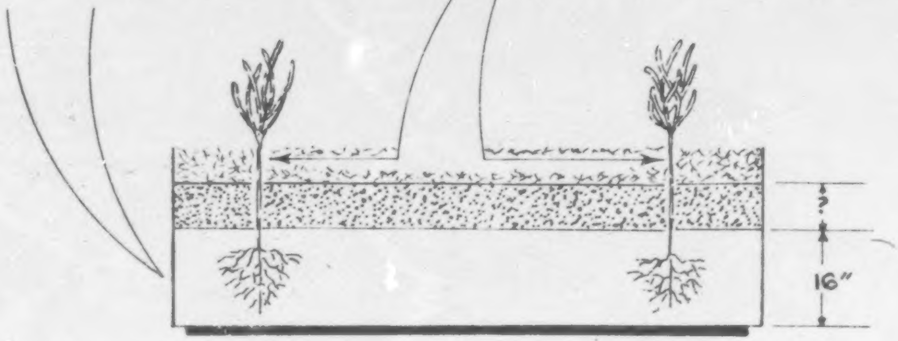
R. GILMORE, INST. MATL. LAB, UK

SETTING HEDGE PLANTS

SET HEDGE PLANTS IN FALL OR SPRING

DIG A TRENCH WIDE ENOUGH TO ACCEPT ROOTS WITHOUT CROWDING. ABOUT 16" DEEP.

SPACE PLANTS ACCORDING TO INSTRUCTIONS:
LARGE – 3 to 4 FEET APART
SMALL – 8 to 12 " APART



USE A STRING TO SET PLANTS IN A STRAIGHT LINE.

CUT BACK PLANTS AT LEAST 1/3 BEFORE SETTING

USE ONLY A LIMITED AMOUNT OF PEAT OR ORGANIC MATERIAL IN TRENCH.

FILL THE BOTTOM OF THE TRENCH AROUND THE ROOTS WITH GOOD TOPSOIL.

FILL THE TRENCH WITH WATER AT PLANTING ALSO COVER AND FIRM THE SOIL.

SIDEDRESS WITH 10-10-10 FERTILIZER AS GROWTH STARTS.

R GILMORE, INST. MATL LAB., UK

CARE AFTER TRANSPLANTING

— SOME DON'TS

DON'T **FORGET TO WATER** transplants at least once a week (10 gallon water)

DON'T **OVERFERTILIZE** - Filling the hole with good topsoil is adequate fertility for a while

DON'T **SHEAR THE TREE** - Shape the small tree by light pruning

Source: Curriculum Development Center, College of Education, University of Kentucky.

Lesson 6

ESTABLISHMENT AND MAINTENANCE OF LAWNS

Objective -- To develop the effective ability of home owners to successfully establish and maintain lawns.

Problem and Analysis -- How can we successfully establish and maintain lawns?

- -Importance of a good lawn
- -Kinds of grasses for lawns
- -Planning a lawn
- -Grading
- -Seedbed preparation
- -Seeding
- -Sodding
- -Lawn maintenance
- -Watering
- -Aeration and water control
- -Renovation

Content

I. Importance of a Good Lawn

A. The lawn is perhaps the most important part of the home ground. It is the garden room carpet --the canvas of the picture painted for the public side of the home.

B. Even the most attractive plants will not give the best appearance on a rough, uneven, poorly-sodded lawn. By the same token, weedy, inferior lawns take just as long to mow as lush, well-tended lawns, and weedy lawns usually have to be mowed more often to look their best.

C. A good lawn holds the soil, thus protecting it from erosion and leaching.

D. A good lawn reduces dust, loose soil and mud that is carried indoors.

E. A good lawn provides a cooler setting for the home, reducing glare and reflected heat from the sun.

F. A good lawn provides protective cover for family recreation.

G. Truly a good lawn makes a house a home.

II. Kinds of Grasses for Lawns

A. Kentucky bluegrass should be the basic grass for most Kentucky lawns.
   1. It is a sod-forming grass that is hardy and long-lived and spreads by underground rootstocks.
   2. It is propagated entirely by seed.
   3. During a drought, bluegrass goes into a semi-dormant or dormant condition for the hot, dry summer weather.
   4. Kentucky bluegrass is somewhat slow to become established.
   5. It will not withstand poor drainage or acidity.
   6. It does not grow well in shady areas.
   7. Kentucky bluegrass is available in several named varieties (Merion, Kenblue, Park, etc). By using a blend of at least two varieties, any given disease may not be as critical as it would be with a single variety because of differences in resistance.

B. Since most lawns will have varying areas of soil fertility, shade, damp areas, etc., a better grass covering may be possible if the lawn is seeded with creeping red or Chewing's fescue. This grass will respond better in shady areas than Kentucky bluegrass. It will also respond better than bluegrass in poor soil.

Creeping red fescue is a fine-textured grass with a high tolerance to soil acidity, low fertility, droughty soils, and shade. It has a creeping habit of growth. Chewing's fescue is a non-creeping form of red fescue.

C. Zoysia is a grass highly advertised in some areas today. In some cases it is portrayed as a "miracle grass" which will eliminate all problems. It is doubtful if it turns out this way.

Zoysia is a warm-season grass making most of its growth during the hot summer season. With the first killing frost in the fall it loses its green color and takes on the appearance of straw. It remains this color in the dormant condition until late spring or early summer.

Zoysia forms a dense turf, resistant to weeds, insects, and diseases. However, it establishes very slowly. In some cases it requires as long as six years to form a solid turf. During the period a person should expect considerable problems with weeds.

Considering alternatives, zoysia should probably not be recommended. But if a person is thoroughly familiar with all situations and still insists on zoysia, by all means go ahead.

D. Another grass that many people see, especially in some areas such as golf courses, is bent grass. Upon viewing this some people go home determined to have a lawn of this grass.

Bent grass is a luxury grass. A person should keep in mind that luxury grasses require a lot of maintenance and are likely to look inferior if not properly cared for. To look its best it requires frequent mowing, top dressing, and occasional thinning. Because it is susceptible to many diseases and pests, it requires constant attention to spraying. Unless a homeowner understands all its peculiarities and can give it the continuous care and attention it demands he would do well to stay with the faithful and reliable bluegrass.

E. Annual ryegrass is used by some people in a lawn mixture. Its only merit is that it serves as a "nurse grass." It germinates very rapidly, offering protection and erosion control early. A lawn can be successfully established without using annual ryegrass as a nurse grass. If a person insists on using it, however, be sure that the seed mixture is not in excess of 15% ryegrass. A mixture containing more than 15% ryegrass might possibly have the ryegrass so thick that when it dies out it would leave large bare spots which would again have to be reseeded to prevent weed growth and provide an even expanse of turf. Kenwell is a new variety with potential for home lawns.

F. Kentucky 31 tall fescue is normally not used for home lawns. It is a coarse-leaved grass which is objectionable for lawns. It will withstand considerable wear and abuse. For this reason it is sometimes used for utility areas, play areas, and athletic areas. Tall fescue performs best when grown alone. When used in a mixture of other grasses it "clumps up" and is very noticeable. When used alone and seeded at a very heavy rate, it tends to grow more upright rather than clumping.

III. Planning a Lawn

A. From the standpoint of appearance, maintenance, and usefulness, an open-center lawn is highly recommended. With this plan the trees and shrubs are planted near the borders leaving a maximum unbroken area. An occasional tree located in the lawn area may be justified. Insofar as possible, drives and walks should not cut through the middle of the grounds, thus marring the beauty and adding to the maintenance.

B. Keep in mind that the most demanding job in lawn maintenance is mowing. Anything that can be done to cut down the amount of time required for this job without sacrificing beauty and usefulness is well worth considering. In order to take advantage of this benefit, design the lawn so it has no square corners. Square corners force stopping, backing up, and lining up again.

Design the lawn so it has free-flowing curves. An addition even to this is to outline the grassed areas with a mowing strip of concrete or brick. One wheel of the mower rolls on the hard edge, making mowing a rapid, nonstop operation with no need for the time-consuming and tiring hand-trimming chore.

C. Do not try to grow grass where grass cannot grow easily or be properly maintained. Such areas include deep shade, steep slopes, dry spots, flooded spots, areas with excessive traffic. Provide for some other cover, such as organic mulch, inorganic mulch or, better yet, ground-cover plants.

D. Plan for any underground installations such as water or electricity, after the rough grading has been done but before the grass is seeded.

IV. Grading

A. The topsoil material should be pushed off to one side until grading operations are complete. Then spread the topsoil evenly over the area.

B. Protect valuable trees by constructing a tree well when the surface is raised or a retaining wall when the surface is lowered a great amount.

C. Avoid steep slopes if possible. If the slope is greater than 10% it may be better to grade to fairly level areas and use a retaining wall between the two levels.

D. The area should be graded so water will drain away from the house and so that there are no low spots where water will collect.

E. Grading should be done so that the lawn can be seeded at the proper time of year. Uneven areas caused by settling can be avoided, to a certain extent, if the rough grading is completed early enough beforehand to give sufficient time for heavy rains to penetrate the area. In the absence of such rains heavy watering will aid the settling process.

[redacted]

F. Before spreading the topsoil over the rough graded subsoil, the subsoil should be worked up to eliminate compacted areas and allow for easier mixing of the upper subsoil and lower topsoil. This allows for a transition zone rather than an abrupt line between the two areas.

V. Seedbed Preparation

A. A soil test should be made in order to be able to apply the correct amounts of lime and fertilizer.

B. Even without a soil test a person should apply one of the all-purpose lawn fertilizers at seeding time. Generally recommended rates will appear on the bag. Lawn fertilizers are especially high in nitrogen, the element responsible for vigorous leafy growth.

C. In areas where phosphorus and potassium are deficient 20 lbs. of 10-10-10 fertilizer per 1,000 square feet should be applied.

D. Lime is called for when the pH drops below 6. Approximately 100 lbs. of ground limestone per 1,000 square feet will raise the pH about one unit.

E. The incorporation of organic matter in the seedbed area will be beneficial. Some possible materials are peat moss, compost or even sawdust. If sawdust is used, incorporate an extra 5-10 pounds ammonium nitrate to affect the drain on nitrogen that decompostion will entail. If, when the grass comes up, it is yellowish in color, add additional nitrogen fertilizer until it is a dark green color.

F. Once again the final operation before seeding should be cultivating and raking to fill in low spots.

VI. Seeding

A. The very best time for seeding grass in Kentucky is late summer. At this time of year there is less competition from annual weeds. Also the cool, moist climate of late fall and early spring can be utilized to establish the crop so it will be able to withstand the hot, dry summer weather.

B. If the grass is sown in spring, it should be done as early as the soil can be worked. It is extremely important that the new crop have a maximum amount of cool, moist weather in which to become established before the hot, dry summer weather. If the soil is properly prepared, a widely used practice in Kentucky is to sow the grass seed while the ground is frozen in a honeycomb condition. The seed can also be sown on a light snowfall.

C. Recommended seeding rates usually are 3 to 5 pounds per 1,000 square feet. A good seed mixture may be 20 - 30% creeping red fescue and the rest Kentucky bluegrass.

In heavy-duty areas, such as athletic areas, playgrounds, and service and utility areas, the seeding rates are considerably higher. Also for seedings made at times other than recommended, the rates are higher.

D. To get even seed distribution, use a mechanical seeder (cyclone seeder is one good example). When seeding (by hand or with a seeder) divide the seed into two lots. Sow one lot moving in one direction, and the other moving at right angles to the first direction.

E. Following seeding the soil should be firmed with a light rolling. This firms the soil and helps hold the moisture in place, thus aiding germination.

F. A mulch over the newly seeded area is desirable. A light covering of weed-free straw or hay will hold moisture and prevent washing of the seed during rainfall or watering. One 60 to 80 pound bale of straw or hay is adequate for 1,000 square feet. Tobacco canvas or commercial mulching cloth are also good to help hold the seeds and moisture in place. They are also especially good for sloping areas.

G. One of the most important steps in successfully establishing a lawn is maintaining a moist soil surface for at least 10 to 20 days after seeding. Grass will germinate and grow only if the proper amount of moisture and a favorable temperature are supplied.

H. Plastic "soaker" hoses are good for watering newly seeded lawns. Any sprinkler used should be one that will break the water into fine droplets.

VII. Sodding

A. In cases where complete coverage is needed immediately, sodding may be the answer. A person should understand that this is the most expensive way to establish a lawn. It may cost as much as 5 to 7 times as much as seeding.

B. The use of a quality sod is a necessity. Much of the sod used in various areas is from pasture. This may be treated to kill broadleaf weeds but not grassy weeds. Such sod is practically worthless. If sod is purchased it should be purchased from a reputable sod nursery. It should be relatively pure and free from both broadleaved weeds and grassy weeds. Use just as much care in buying sod as in buying seed.

C. For sod, the seedbed should be prepared and fertilized the same as for seeding.

D. The sod should not be more than one inch thick. Sod 3/4 inch thick will establish itself sooner than thicker sod.

E. A person should lay the sod as he would brick, thus preventing continuous joints. Fit them together as tightly as possible. After laying the initial strip, place a board on this strip. Kneel on the board rather than on the newly laid sod. Move the board forward as work progresses.

F. When the job of laying the sod is complete, tamp it lightly and topdress it with a small amount of high quality topsoil. Work this topsoil dressing into the joints between the strips of sod, using a broom or the back of a rake.

G. Keep the sod moist until well established.

VIII. Lawn Maintenance

A. Mowing

1. Newly seeded lawns should be mowed the first time when the grass is 3 to 4 inches tall. For the first mowing, set the mower so as to mow 3 inches high. Subsequent mowings can be gradually closer until the height of 1½ to 2 inches is reached.
2. Frequent mowing with a sharp, properly adjusted mower will keep the lawn looking neat and promote the spreading of the desired grass plants.
3. Improper mowing can ruin a lawn the same as diseases, insects and other hazards. Too close mowing causes the grass to become thin and shallow-rooted and susceptible to diseases, weeds and drought.
4. Bluegrass and creeping red fescue are best kept clipped to a height of 2 inches. The lawn should be clipped often enough so that no more than 1 inch of blade is removed at one time.
5. The main reason for mowing the lawn is to keep it even, more than it is to keep it short. When the grass is mowed no closer than 2 inches the remaining growth shades the ground and helps reduce the growth of annual weeds.
6. Be careful to keep the mower sharp. A dull blade batters the ends of the grass blades causing them to take on a brownish appearance shortly after mowing.
7. In order to reduce the build-up of thatch in the lawn, the clippings should be removed by sweeping, raking or the use of a grass catcher on the mower.

B. Fertilizing and Liming

1. A soil test every 3 to 5 years should be the basis for lime application.
2. There is no hard rule as to the frequency of lawn fertilization. Usually the more frequent the application the nicer the lawn. At least two applications of complete fertilizer should be made - one in the fall and one in the spring. Approximately 10 pounds of a 10-10-10 fertilizer per 1000 square feet may be applied each time.
3. In addition to the basic fall and spring applications, many people are applying additional nitrogen at intervals during the growing season. Some go so far as to apply ammonium nitrate each month during the growing season. One to two pounds per 1,000 square feet should be sufficient. During a hot, dry summer the July application may be omitted if the grass is going into a semi-dormant period. It is beneficial if these nitrogen applications are watered in. Do not apply fertilizer when the grass is wet unless it is to be watered in immediately.
4. Keep in mind that excessive nitrogen results in soft, succulent grass and favors disease development.

C. Controlling Lawn Enemies

1. There are several weeds that grow in Kentucky lawns: crabgrass, dandelion, plantain (common and buckhorn) and chickweed.
2. A severe infestation of any of these weeds can probably be brought under control only by the use of chemicals. However, there are some good management practices which will aid in keeping such weeds under control:
    a. Keeping a dense turf which reduces weeds by mowing no closer than two inches.
    b. Applying adequate fertilizer to keep the grass strong and aggressive.
    c. Seeing that the soil is thoroughly watered when dry to keep the grass actively growing.
    d. Scattered weeds should be removed by hand or by spot treatment with the

proper chemicals to eliminate a possible source of infestation.

e. Renovate poor lawns in the fall so as to benefit from the cool nights and fall rains.

3. In general, broad-leaved weeds can be controlled with the chemical herbicides of the 2,4-D type. Best results are usually obtained with either spring or early fall applications applied to young weeds while the temperature and moisture conditions are favorable to rapid growth. With some of the more persistent weeds, such as dandelion, retreatment will no doubt be necessary.
4. When using any chemical always read and follow all precautions recommended by the manufacturer. Also, since sprayers are difficult to clean, it is best to have a special sprayer for applying herbicides only.
5. Crabgrass and other annual weed grasses can be controlled with chemicals. A pre-emergent chemical should be used. It must be applied early, before the crabgrass germinates. When the forsythia are in full bloom is usually the best time for pre-emergent crabgrass chemical to be applied. If, for some unexplained reason, poor control of crabgrass results from this application a post-emergence control can be used. This should be applied early, as the crabgrass is easier to kill and an early kill will reduce its competition with and smothering of the desired grasses.
6. Newly seeded lawns should have at least 3 months of growing weather before being treated with crabgrass control chemicals.
7. There are many diseases which affect turf grass. In many instances they never become severe, but given the right conditions they can spell disaster. If the lawn is given the proper care with respect to mowing, fertilizing, and watering, diseases are less likely to be a serious problem.
8. Many of the more common lawn diseases are caused by a fungus. Such diseases are controlled by using chemicals called fungi-

cides. There are many kinds of fungicides available. Fungicides are most effective against lawn diseases when used as a preventive, rather than a control measure. Preventive application must be made at 1 to 2 weeks intervals. For a lawn with a history of disease problems a person should consider these regular preventive applications.

9. Grubs are one important insect which can cause substantial damage to lawns. They feed on the roots, causing the grass to turn brown and die in irregular patches. This is especially noticeable in the summer months. Some of the common insecticides that are effective in controlling grubs are chlordane, sevin and diazinon.
10. Chinch bugs feed on grass, causing it to turn yellow and wilt, then turn brown and causing dead patches. Diazinon and sevin are effective controls.
11. Sod webworms are the larval stage of a moth that cause damage by clipping grass blades close to the ground and pulling them into their silk-lined tunnels near the soil line. This area may turn yellow and die, especially during dry weather. When the moths are present, a person can tell as he walks through the lawn. They fly in a jerky zigzag manner. Within 1 to 2 weeks after moths are most abundant, most of the eggs laid for the next generation will be hatched and the larvae feeding again. This is the time when insecticides will be most effective. There may be as many as three generations of sod webworms a year. Sevin and diazinon are effective controls.
12. Moles can cause considerable damage to a lawn by burrowing around in search of food. They feed on insects such as grubs. The recommended control consists of eliminating these grubs. This sometimes takes a few months. In the meantime traps may be the best immediate control.

IX. Watering

A. The decision to water a bluegrass-fescue lawn will be determined, at least in part, by the homeowners desire to keep it a dark green color throughout the growing season.

B. Bluegrass and fescue are seldom killed from drought. They will lose their green color and turn brown during a prolonged hot, dry spell, but they will green and resume growth when the rains come.

C. If watering is to serve the intended purpose it must be properly done. It is best to soak the lawn every week to 10 days rather than sprinkle lightly at more frequent intervals. Wet the soil 6 inches or more. This will take a rather large quantity of water.

X. Aeration and Thatch Control

A. After a period of time the lawn may become compacted with a hard crust. Traffic is one of the principal reasons. Also, soils with a high clay content are more apt to become compacted.

B. If a lawn is allowed to remain tightly compacted, air, water and plant nutrients will be restricted from the plant roots. As this condition persists the roots become shallow, with less drought tolerance. It will become thin, allowing weeds to gain a foothold.

C. Benefits of aeration include:

1. Reduces the loss of water and fertilizer as the water run-off is reduced.
2. Makes conditions more favorable for decomposing organisms, converting organic matter into useful soil humus.
3. By opening the surface it permits better penetration of chemicals for pesticide control.
4. Ventilates the soil allowing oxygen to get to the roots more easily and abundantly.

D. Aeration is best done in the spring or fall when the desired grasses are growing vigorously.

E. The type of aerator commonly used is one that removes plugs of soil from the turf. These plugs can be raked up and removed or crushed by rolling and then raked into the turf.

F. The average homeowner will not need to buy an aerator. They should be available at lawn equipment rental agencies.

G. On lawns where the clippings are left, they may accumulate to the point that there is a heavy build-up of thatch. When heavy thatch accumulates it should be removed. Thatch of a thickness in excess of ½ inch may create serious maintenance problems.
   1. Being highly moisture absorptive it will prevent much of the water from irrigation or rains from getting into the soil and the root zone.
   2. It will reduce penetration of lime and fertilizer, as well as pesticide materials.
   3. A build up of thatch is favorable to the development of disease-causing organisms.

H. Thatch is removed with a vertical mower which slits the turf and removes the thatch material. This is best done in the spring or fall when the desired grasses are growing vigorously.

I. Thatch removers should be available on a rental basis.

XI. Renovation

A. When the stand of desirable grasses in the lawn is less than 50 percent it is in need of renovation.

B. Before renovating the lawn a person should investigate to determine what caused the lawn to be in the poor shape it is in. This problem should be corrected first. Some possible reasons for a poor lawn could be poor soil, shade, lack of fertility, acid soil, compacted soil or neglect.

C. The most favorable time for renovating a lawn is the same as for establishing a new lawn - late summer and early fall is best with early spring as second best.

D. The first step in lawn renovation is a strict clean-up. Get rid of all weeds, leaves and weedy grasses. Mow closely and rake to remove all loose materials. Use a rake, tiller, or disk to cultivate the surface sufficiently so fertilizer can be worked into the soil. Aerate any compacted areas.

E. Apply lime and fertilizer as indicated by a soil test.

F. The procedure for seeding, watering and mowing the newly germinated grasses is the same as for establishing new lawns.

Suggestions for Teaching the Lesson

I. Developing the situation

A. Things to be brought out by the teacher:
   1. A person can go to a lot of time and expense to build a comfortable home and establish shrubs and trees, but if he is unsuccessful in his attempts to have a beautiful lawn the result will be less than satisfactory.
   2. The homeowner does not have to be an expert to grow a good lawn but there are sound establishments and maintenance practices which should be followed. Those are related to seeding, mowing, fertilizing, controlling pests, and watering.

B. Things to be brought out by students:
   1. Think of the homes that they have seen and consider to be beautiful. Identify the factors which make these homes beautiful. A well-kept lawn will, no doubt, be one of these factors.
   2. Students' personal experience with different lawn grasses.
   3. Also students' experiences in other areas such as:
      a. Fertilizing
      b. Mowing at different heights

   c. Weed and crabgrass control
   d. Disease and insect problems

II. Conclusions

A. A good lawn is the basic part of a good landscape plan.

B. A mixture of Kentucky bluegrass and creeping red fescue or Chewing's fescue is generally best for Kentucky lawns.

C. Mowing the grass extremely close does not reduce the frequency of mowing.

D. Although fertilizing may increase the number of mowings required, it is necessary in order for the lawn to keep a dark green color and remain aggressive and weed free.

E. Need for mowing is indicated more by unevenness of the grass than it is by height.

F. A poor lawn may be renovated rather than plowing up and starting all over again.

III. Enrichment Activities

A. Arrange for field trips in order to learn to identify different lawn grasses, such as bluegrass, creeping red fescue, zoysia, and bentgrass.

B. Visit a golf course and talk to the greens superintendent, or some other such person, to determine the maintenance jobs carried out.

C. Visit a new home site to observe establishing a lawn.

D. Visit a site where a lawn is being renovated.

E. If possible, arrange for a demonstration on the use of a thatching machine and/or aerating machine.

[redacted]

IV. Suggested Teaching Materials

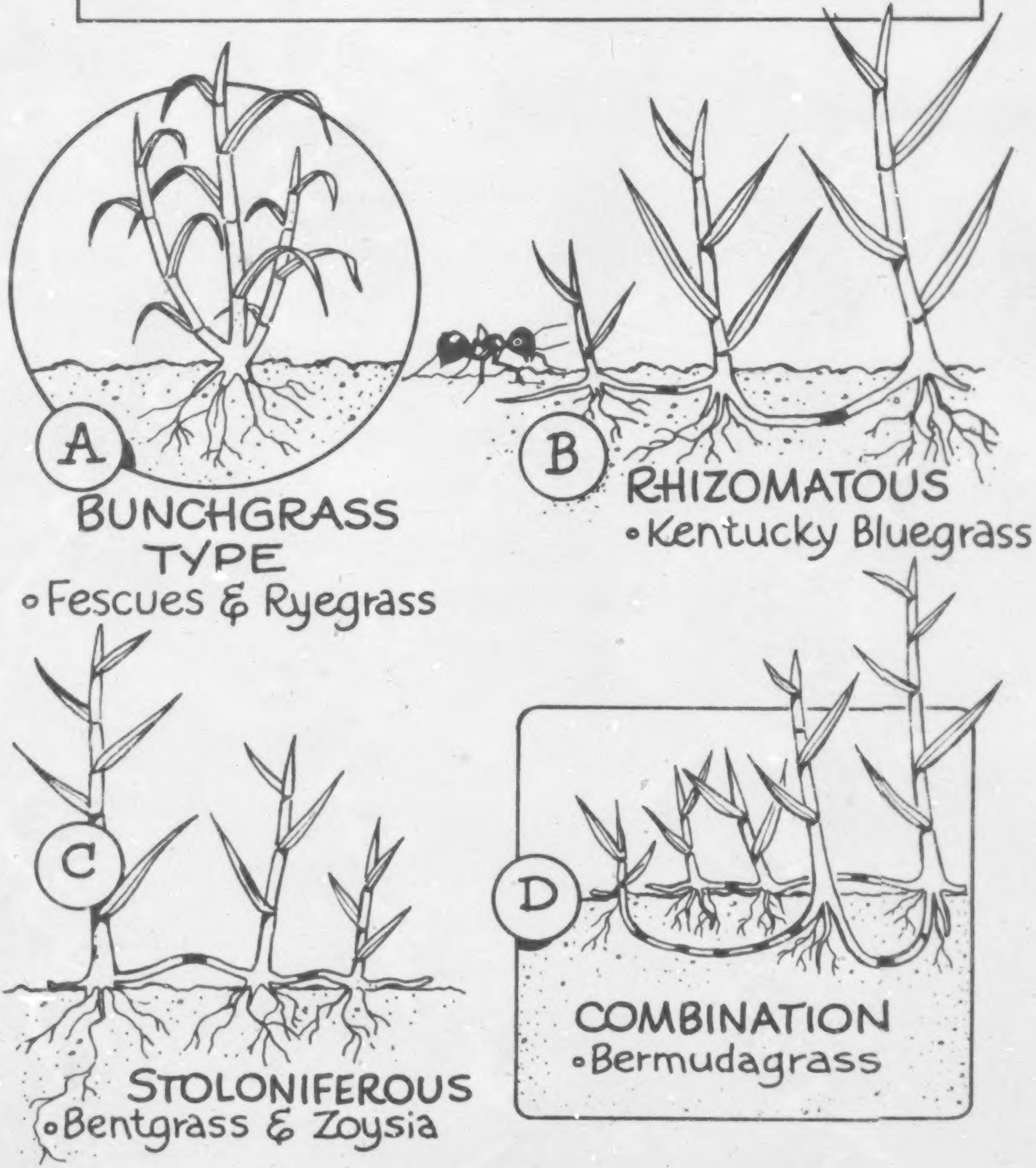
A. References
   1. A Perfect Lawn The Easy Way by Paul N. Voykin, pp. 13-124.
   2. Approved Practices in Beautifying the Home Grounds, pp. 69-123.
   3. Better Homes and Gardens New Garden Book, pp. 36-68.
   4. Better Lawns, U.S.D.A. Home and Garden Bulletin No. 51.
   5. Home Lawns, Correspondence Course 130, The Penn State University.
   6. Home Lawns in Kentucky, University of Kentucky Cir. 618.
   7. Horticulture Unit - Maintaining The Home Landscape HS-83, University of Kentucky.
   8. Landscaping and the Small Garden by Marjorie Diety, pp. 21-29.
   9. Lawns and Ground Covers, Time-Life Books, pp. 7-101.
   10. Making Things Grow Outdoors by Thalassa Cruso, pp. 96-126.
   11. Minimum Maintenance Gardening Handbook by Walter F. Bruning, pp. 62-80.
   12. Reader's Digest Practical Guide to Home Landscaping, pp. 254-263.
   13. The Complete Gardener by Lois Wilson, pp. 211-218.
   14. University of Kentucky Unit - Starting The Home Landscape HS-82.

B. Resource Presonnel
   1. Extension specialists
   2. Local sources
   3. Grounds keeper from a golf course or park
   4. For specific personnel see VoAg Directory of Resource People in Kentucky

C. Audio-Visuals
   1. Slide Series -"Lawn Care and Management" developed by Dr. Robert W. Miller for the Ag Ed Curriculum Materials service, The Ohio State University.
   2. Masters
      -1 Lawn Grass Growth Habits

-2 Liming and Fertilizing Lawns
-3 Lawn Care During Seed Germination
-4 Sodding a Lawn
-5 Seeding the Lawn
-6 Mowing Height
-7 Nutrients in Clippings
-8 Lawn Fertility Maintenance
-9 Weed Control in Established Lawns

LAWN GRASS GROWTH HABITS


A
BUNCHGRASS TYPE
∘Fescues & Ryegrass
B
RHIZOMATOUS
∘Kentucky Bluegrass
C
STOLONIFEROUS
∘Bentgrass & Zoysia
D
COMBINATION
∘Bermudagrass

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APPLICATION RATES FOR LAWN FERTILIZERS

FERTILIZER	POUNDS TO APPLY PER 1,000 SQUARE FEET OF LAWN WHEN THE AMOUNT OF NITROGEN DESIRED IS:		
	1 POUND	2 POUNDS	3 POUNDS
* 6-12-4	17	34	50
*10-10-10	10	20	30
*12-12-12	9	17	25
*15-15-15	7	13	20
AMMONIUM NITRATE (33% N)	3	6	9
AMMONIUM SULFATE (20.5% N)	5	10	15
NITRATE OF SODA (16% N)	7	13	20
POTASSIUM NITRATE (13% N - 44% K_2O)	8	16	24

* With complete fertilizers the lawn is also supplied with phosphorus and potassium. When establishing a lawn, use a complete fertilizer in areas where phosphorus and potassium are lacking. A mixture of half ammonium nitrate and half potassium nitrate gives a 23-0-22 formula, approximately. For lawn maintenance, straight nitrogen fertilizers may be used some years, but not continuously.

Adapted from page 7 of "Better Lawns." (USDA Home and Garden Bulletin 51)

AMOUNT OF GROUND LIMESTONE NEEDED TO NEUTRALIZE SOIL ACIDITY IN LAWNS

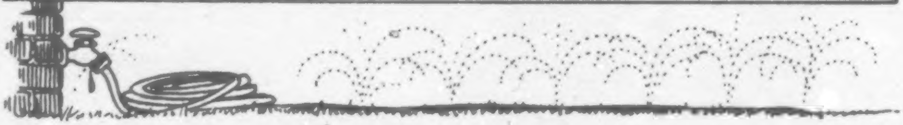
SOIL REACTION (pH)	POUNDS TO APPLY PER 1,000 SQUARE FEET		
	SANDY SOIL	LOAM SOIL	CLAY SOIL
4.0	100	150	200
4.5	90	135	180
5.0	75	110	150
5.5	50	75	100
6.0	25	50	75

Source: Instructional Materials Laboratory, University of Kentucky. [redacted]

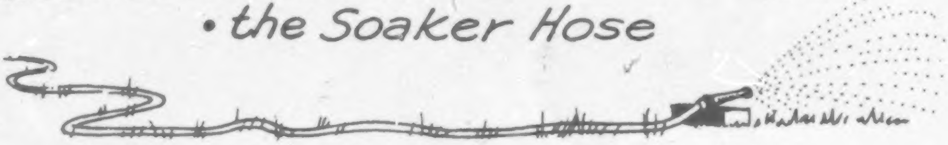
Adult 110-6-2

LAWN CARE *during* SEED GERMINATION

WATER the NEWLY SEEDED LAWN

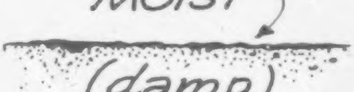


- *the Soaker Hose*



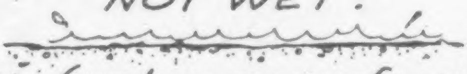
- *the Regular Hose*

KEEP SOIL SURFACE MOIST AT ALL TIMES



MOIST

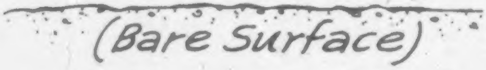
(damp)



NOT WET!

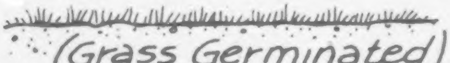
(water on surface)

LESS FREQUENT WATERING AS SEED GERMINATES



WATER NEEDED

(Bare Surface)



LESS WATER NEEDED

(Grass Germinated)

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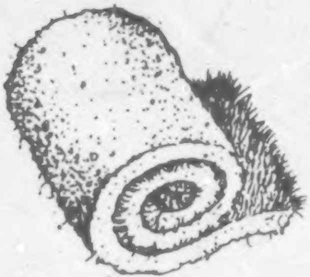
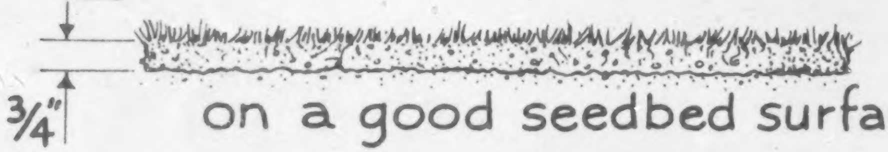
SODDING A LAWN



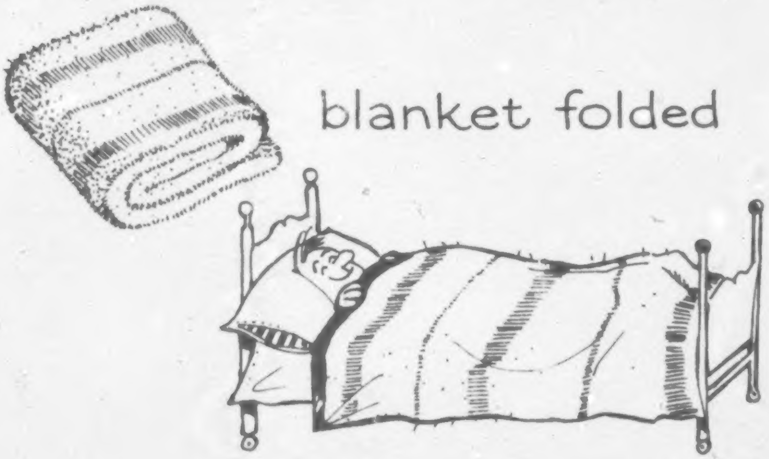
a roll of sod



on a good seedbed surface

PROTECTS THE SOIL

(PREVENTS EROSION)



blanket folded

KEEPS YOU WARM

(PREVENTS EXPOSURE)

Adult 110-6-4

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[redacted]

GOOD SEEDING RATES FOR THE LAWN

KIND OF PLANT (SPECIES)	POUNDS OF SEED PER 1,000 SQUARE FEET	
KENTUCKY BLUEGRASS	3-4	(1½-2)
FESCUE (CHEWING'S OR CREEPING RED)	6	(3-4)
ANNUAL RYEGRASS (TEMPORARY LAWN)	5-6	(6-10)
REDTOP (TEMPORARY LAWN)	5	(1)
TALL FESCUE	6	(6-10)

RELATIVE SEED NUMBER PER POUND OF SELECTED LAWN PLANT SPECIES

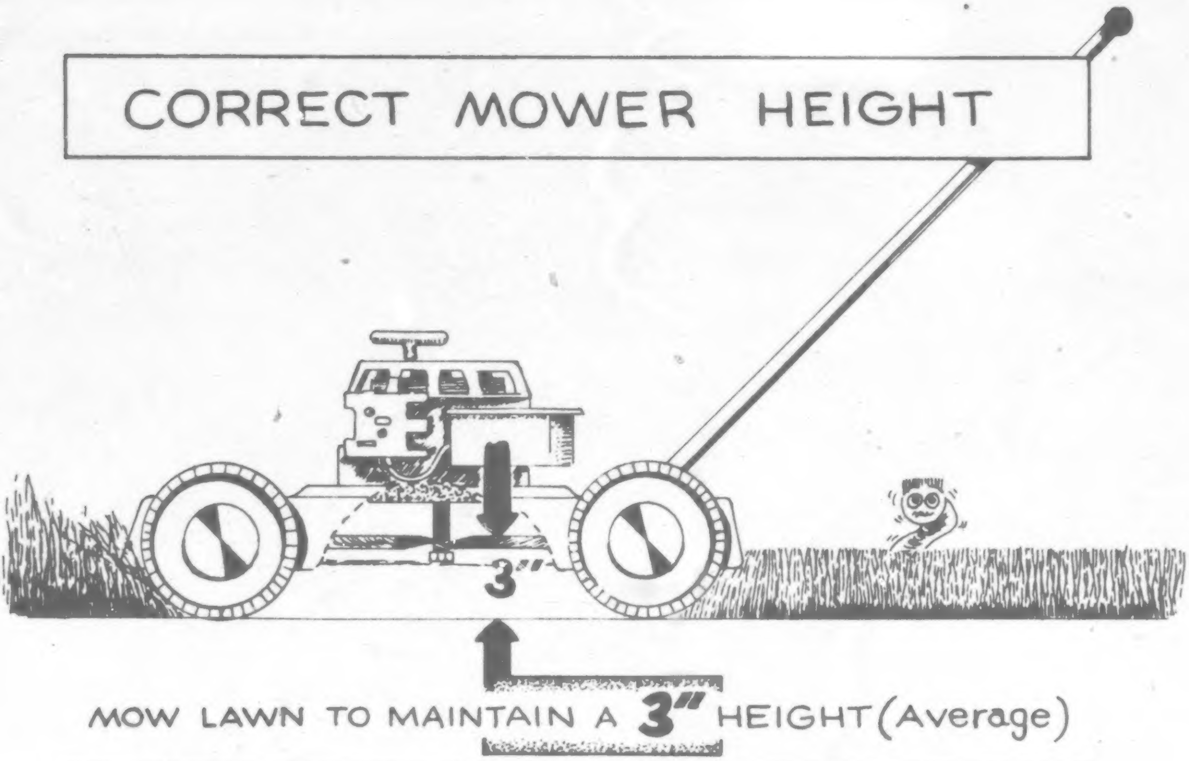
KIND OF PLANT (SPECIES)	APPROXIMATE NUMBER OF SEEDS PER POUND
KENTUCKY BLUEGRASS	2,200,000
FESCUE (CHEWING'S OR CREEPING RED)	545,000
ANNUAL RYEGRASS	225,000
REDTOP	4,990,000
TALL FESCUE	225,000
WHITE CLOVER	750,000 (by Contrast)

(Adapted from Ky. Cir. 618).

Source: Instructional Materials Laboratory, University of Kentucky.

Adult 110-6-5

CORRECT MOWER HEIGHT



MOW LAWN TO MAINTAIN A **3"** HEIGHT (Average)

MOWING HEIGHT *for* LAWN GRASSES

SPECIES	DESIRABLE HEIGHT
KENTUCKY BLUEGRASS	2-3
CREEPING (Red) FESCUES	2-3
ZOYSIA	½-1
BERMUDAGRASS	½-1
TALL FESCUE	3-4
REDTOP (Temporary)	3
RYEGRASS (Temporary)	3
	INCHES

R.GILMORE, INST, MATL. LAB., UK

NUTRIENTS IN CLIPPINGS FROM A ONE-FOURTH ACRE LAWN IN A YEAR

(YIELD WAS ½ TON OF DRY CLIPPINGS)

NUTRIENT	FORM	POUNDS
NITROGEN	N	*30
PHOSPHORUS	P_2O_5	10
POTASSIUM	K_2O	25
CALCIUM	CaO	10

*SOME NITROGEN MAY CHANGE TO A GAS AND BE LOST DURING DECOMPOSITION.
-- BASED UPON INFORMATION ON PAGE 84 OF THE LAWN BOOK BY SCHERY

AMOUNT OF GROUND LIMESTONE NEEDED TO NEUTRALIZE SOIL ACIDITY IN LAWNS

SOIL REACTION (pH)	POUNDS TO APPLY PER 1,000 SQUARE FEET		
	SANDY SOIL	LOAM SOIL	CLAY SOIL
4.0	100	150	200
4.5	90	135	180
5.0	75	110	150
5.5	50	75	100
6.0	25	50	75

[redacted]

Source: Instructional Materials Laboratory,
University of Kentucky.

Adult 11[illegible]-6-7

LAWN FERTILITY MAINTENANCE

FOR AREAS LOW IN PHOSPHATE AND POTASH PER 1000 SQUARE FEET:

1) 10-15 # OF 10-10-10 FERTILIZER - NOVEMBER
2) 6- 7 # OF 10-10-10 FERTILIZER - WHEN GRASS GREENS-SPRING
3) 1 # OF AMMONIUM NITRATE - 6 WEEKS LATER
4) 1 # OF AMMONIUM NITRATE - 1 MONTH LATER

IN AREAS WHERE PHOSPHATE AND POTASH ARE ADEQUATE-PER 1000 SQUARE FEET

1) 3- 5 # OF AMMONIUM NITRATE - NOVEMBER
2) 2 # OF AMMONIUM NITRATE - WHEN GRASS GREENS-SPRING
3) 1 # OF AMMONIUM NITRATE - 6 WEEKS LATER
4) 1 # OF AMMONIUM NITRATE - 1 MONTH LATER

TEST SOIL EVERY 3 YEARS FOR BEST KNOWLEDGE OF FERTILITY

Source: Instructional Materials Laboratory, Adult 110-6-8
University of Kentucky.

AGR–21
(Formerly Misc. 322)

1973—Weed Control Recommendations for Established Bluegrass Lawns

By J. W. HERRON and HAYDEN WATKINS

Weed	Herbicides	Suggested time of Applications	Comments
Buckhorn plantain Wild garlic Broad-leaved plantain Ground Ivy Dandelion Henbit and other broadleaf weeds	2, 4-D 2, 4-D + dicamba (Banvel D) 2, 4-D + silvex silvex (2, 4, 5 TP)	Spring-March, April May Autumn-September, October, or early November	NOTE: Any of the herbicides in the brackets is effective against any weed in that section. For example silvex could be used on Buckhorn plantain, and so on. Repeated spot treatments following first applications may be necessary. Clover may be severely injured or killed. Avoid spray drift that might injure desirable plants. Do not use same spray equipment for spraying flowers, vegetables, fruits, or shrubs. Do not use dicamba where the chemical may be washed into root zone of desirable trees or shrubs.
Chickweed Star-of-Bethlehem	2, 4-D + silvex 2, 4-D + dicamba (Banvel D) silvex dicamba (Banvel D)	Chickweed: Spring-March or early April before seeds develop. Autumn-October or November Star-of-Bethlehem: March or April	
Knotweed Red sorrel (Sheep sorrel) White clover Wood sorrel (Oxalis)	dicamba (Banvel D) 2, 4-D + dicamba (Banvel D)	After plants have emerged in spring or early summer	
Crabgrass (Pre-emergence in newly-seeded lawns)	siduron (Tupersan)	Can be applied at seeding time or on young, seedling grass.	At least 1/2 inch of water must be provided by rainfall or irrigation within 3 days after treatment.

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*To simplify information in this publication, trade names of some products are used. No endorsement is intended, nor is criticism implied of similar products not named.

UNIVERSITY OF KENTUCKY
COLLEGE OF AGRICULTURE • COOPERATIVE EXTENSION SERVICE
Agriculture • Home Economics • 4-H • Development

Weed	Herbicides	Suggested time of Applications	Comments
Crabgrass (Pre-emergence in established lawn) Foxtail, Goosegrass and many other annual grasses	benefin bensulide (Betasan or Prefar) DCPA (Dacthal) siduron (Tupersan)	In southern Kentucky before April 1, and in northern Kentucky before April 10.	Apply anytime before crabgrass seeds germinate. Follow label closely for rate of material on given area.
Crabgrass and Dallis grass (Post emergence)	DSMA (Disodium methanearsonate) MSMA (Monosodium methanearsonate)	Early stage of growth; make three applications at 7-10 day intervals, or as regrowth occurs.	May cause temporary discoloration of turf grass. Best results are obtained if treatments are made when plants are tender and in rapid growth stage.
Poison Ivy	AMS (Ammate) amitrole (Amitrol, Cytrol, Amino Triazole or Weedazol)	Spring or early summer when plants are in rapid growth stage.	These herbicides are non-volatile and can be used safely near flowers, vegetables, and ornamental plants. Avoid drift to such plants while spraying.

Follow closely the directions on the label. Many different formulations and combinations of these materials are sold under various trade names, and the quantity to use will vary with the formulation obtained.

Agricultural and Home Economics Extension Service of the University of Kentucky, the United States Department of Agriculture cooperating. Charles E. Barnhart, Director. Issued in furtherance of the Acts of May 8 and June 30, 1914.

Issued 3-65; 127M to 2-72; 10M-3-73

Lesson 7

LANDSCAPE MAINTENANCE

Objective -- To develop the effective ability of home owners to properly maintain the home surroundings.

Problem and Analysis -- How should we properly maintain the home surroundings?

- -Fertilizing Landscape Plants
- -Pruning
- -Mulching
- -Insect and Disease Control
- -Winter Protection
- -Structures

Content

I. Fertilizing Landscape Plants

A. Once a tree has become established it should be fed regularly. A tree will "get along" in a reasonably fertile soil without special feeding, but it will grow better, look better, and stay healthier if properly fertilized.

B. Commercial fertilizer containing nitrogen, phosphorus and potassium is perhaps the quickest and most economical way to add the needed plant nutrients. A 10-10-10 grade is a good all-purpose fertilizer for many of the more common ornamental plants.

C. Use one to two pounds of fertilizer for each inch of tree diameter at chest height. The heavier applications are to be used on larger trees, perhaps eight inches and up.

D. There are at least four ways to feed a tree:

[redacted]

1. Punching holes method.
    a. With a crowbar or similar instrument, make holes 18 inches deep and two feet apart. With small trees do not make holes within one foot of the trunk. For large trees do not make holes within three feet of the trunk. Approximately ten holes should be made for each inch of tree diameter. These holes should extend outward to just past the spread of branches.
    b. Before applying the fertilizer, mix it with an equal amount of sand, peat moss, or a mixture of the two. By mixing it this way a person is making extra provision against burning the tree roots. Apportion an equal amount of the fertilizer mixture for each hole.
    c. After the fertilizer has been placed in the holes, finish filling them with sand, peat moss, topsoil or any of several other suitable materials. Replace the sod. If the area is watered, it should be thoroughly soaked to help prevent pockets of highly concentrated solution which could burn the roots.
    d. The job of punching holes will be easier if the soil is moist. If not moist by natural means a person can soak the area a few days before fertilizing to make the job easier.
    e. This is probably the most hazardous and thus, least desirable method.
2. Fertilizer stake method. "Stakes" of slowly dissolving fertilizer materials are now available commercially. These are easily driven and safe to use, and appear to have a good potential.
3. Injector Method.
    a. An injector for fertilizing trees is a hollow, pointed shaft, three to four feet long, tapped by a cylinder into which cartridges of concentrated fertilizer are fitted.
    b. When attached to a garden hose it is

stuck into the ground at two to three foot intervals in the feeding zone. This zone is the same as in the "punching" method.

        c. The fertilizer solution flows out of holes near the bottom of the injector.
        d. Since the plant nutrients are in solution when applied in an injector, an additional feeding or two may be beneficial in late spring or early summer.
    4. Broadcasting fertilizer on the soil surface below a tree is another method of fertilizing trees. It is doubtful if all the tree roots will benefit from such a method but it may be satisfactory for an occasional feeding, especially for smaller trees.
    5. Foliar feeding consists of spraying a feeding solution directly on the leaves.
        a. The results from this method will be noticeable sooner than other methods because the leaves do not have to wait for the nutrients to travel up from the roots.
        b. This method should not be used exclusively but in combination with the punch-hole or injector method.
        c. It is particularly helpful for a tree that is seriously undernourished or for a tree whose roots are growing where they cannot be reached by punched holes or an injector.
        d. The device used for this method is a siphon-type sprayer containing a jar of about one to two pints in size and filled with concentrated liquid fertilizer. When attached to a garden hose the concentrate is drawn into the stream of water and diluted as it is sprayed out.

E. Some trees will require fertilizing every year; others may only require fertilizing every 2 or 3 years. Some indications that the plants need fertilizing are:
    1. Foliage is thinner than usual.
    2. It has the appearance of dying back, losing leaves at the top.

3. Leaves are prematurely off-color.
4. An abundant supply of dead limbs is noticed.
5. The leaves are smaller than usual.
6. The twig growth is shorter than usual.
7. The plant is damaged by some means, physical, mechanical, etc.
8. Insects and/or diseases attack the plant.

F. The best time to fertilize trees is in the early spring or late fall after the plant has gone into the dormant period. Fertilizer applied in the fall has more time to move about in the soil and become available to plant roots. Another point in favor of late fall applications is that potassium helps impart winter hardiness.

G. Evergreen trees do not require as much fertilizer as deciduous trees, nor do they have to be fed as frequently.

1. The deciding factor should be the tree itself. If it seems not to be doing well and does not have a healthy color, fertilizing may help.
2. Keep in mind that an excessive amount of fertilizer will cause rapid growth, resulting in more space between the whorls of branches and thus preventing a compact, bushy plant.

H. For young, well-established, needle-leaf evergreen trees, use one-fourth to one-half pound of fertilizer per foot of height. For older trees use one to one and one-half pounds per inch of trunk diameter. For small trees, the fertilizer can be spread around the plant and be worked into the top inch of soil. For large, older trees use the punch hole method.

I. Needle-leaf shrubs, when in need of fertilizer, should be fed up to one-half pound of fertilizer in the early spring.

J. Broadleaved evergreens require soil with generous amounts of organic matter. With the proper soil, the fertilizer needs are really quite negligible.

Here again, let the plant be the guide. Use fertilizers recommended for acid-loving plants.

K. Evergreens grow best in an acid soil below pH 6.0.
   1. This is especially true for most broad-leaved evergreens, which may require a soil with a pH of 5.0 or below.
   2. In order to be sure of the pH, a soil test is necessary; in the absence of a test apply a handful of sulfur, aluminum sulfate or ammonium sulfate per plant to keep the pH on the acid side.

L. Under most conditions, deciduous shrubs will need fertilizing to keep them vigorous, healthy, and producing the desired growth and flowers. However, applying fertilizer when it is not needed will require additional pruning and result in a loss of the compact appearance and at least a partial absence of flower buds.

M. Fertilizer should be applied on deciduous shrubs in the spring anytime during the period when the buds are breaking until after flowering.
   1. The specific time will vary with individual plants.
   2. Fertilizing of spring-flowering plants can be delayed until after flowering to help promote new growth for next year's flowering wood.
   3. Summer-flowering shrubs should be fertilized earlier when the buds are just beginning to break.

N. Use ½ cup of a 5-10-5 fertilizer per one foot height (or spread).
   1. Shrubs and small trees 15 feet high or more can use as much as five pounds of 5-10-5 fertilizer.
   2. In cases where there are numerous shrubs in an area, a person may choose to apply the fertilizer over the general area. In such a case use 15 to 20 pounds per 1000 square feet.
   3. In individual plant applications, broadcast

the fertilizer, extending it out as far as the branches.

O. Some plants will benefit from special treatment. This treatment can be determined by studying the plants used in the landscape. Some examples are:
   1. Adding superphosphate or bone meal to lilacs, flowering dogwood, and vines such as wisteria to produce more flowers the following season.
   2. A small handful of epsom salt applied to dogwood trees yearly will make a noticeable difference in the growth and appearance of the tree.

P. Vines and groundcover plants should be fertilized about the same as shrubs.
   1. In early spring apply 10 to 15 pounds of a 10-10-10 fertilizer per 1,000 square feet of groundcover plants.
   2. For small vines, scatter a handful of 10-10-10 about the plant in the early spring; large vines use more accordingly.

Q. Ornamental plants, especially flowering shrubs and evergreens, perform better if the soil can be kept evenly cool and moist.
   1. The most satisfactory way to provide these conditions is to cover the soil with an organic mulch.
      a. Any one of several materials can be used.
      b. Some possibilities are wood chips, ground bark, pine needles, leaf mold, compost, decayed sawdust,or coarse peat moss.
   2. Added benefits from using mulch are that it helps keep down weeds, protects the feeder roots of the shrubs, and makes the job of mowing and trimming the lawn go easier. Most homeowners could reap these benefits by using mulches on a wider scale than they are now doing.

II. Pruning

A. Deciduous trees need pruning to remove dead, diseased or injured wood to bring out the natural shape and beauty of the tree, and to keep the tree strong and vigorous.

1. A very desirable time for pruning shade trees is late summer. Some trees can be pruned in late winter or early spring.
    a. A person should, however, take notice of the fact that there are some trees which "bleed" profusely when cut toward the end of the dormant season.
    b. Among the "bleeder" trees are maples, birch, walnut, yellowwood, beech and hornbeam.
    c. Ornamental trees that bloom in the spring and are not "bleeders" are usually pruned immediately after blooming.
2. Prune shade and ornamental trees in the way that they want to grow naturally. A weeping tree cannot be made into an upright tree.
3. Dead wood as well as limbs that are broken or severely injured by diseases or insects should be removed.
4. Water sprouts, succulent, single-stemmed branches growing off a main limb should be removed. Sucker growth from the base of the tree should also be removed.
5. When two branches rub, the constant rubbing will open a wound in the bark through which diseases and insects make an entry. Thus, one of the two rubbing branches should be removed while saving the one which contributes most to the appearance of the tree. If a person decides that in order for the appearance of the tree to be saved both branches must be saved, they both should be fastened together where they cross or rub. Bore a hole through both limbs and insert a stove bolt of suitable length with both the head and the nut countersunk. With this operation, grafting will take place, thus removing the hazards of an open wound.
6. A tree that is properly pruned when young will require less maintenance pruning later on.
    a. Before any pruning is done study the tree thoroughly.
    b. Before removing a limb, try to visualize what the appearance of the tree will be with the limb removed.

c. Ask the question, "Will the removal of the limb spoil the tree's appearance?" If the answer is no, then it may be removed.

7. Establish one main central leader for the tree.
   a. Two or more main trunks on a large tree make it particularly susceptible to wind damage. The crotch between the trunks is usually at so small an angle that there is little or no growing wood to bind the trunks together.
   b. Do not ever cut the main and tallest leader of a young shade tree of a tall growing species. Cutting the leader will encourage the growth of competing branches and in a few years the tree will have two or more leaders which will be unsightly and susceptible to wind and storm damage.
   c. There are some exceptions to this principle - certain trees such as some maples and birches are normally grown with multiple trunks which constitute part of the natural shape.
8. In the crown and upper trunk decide what branches will make the best limbs.
   a. Get rid of those that grow at a narrow angle to the trunk and save those that jut out more.
   b. Branches with narrow crotches are susceptible to wind and storm damage.
   c. In older trees especially, it will probably be impossible to eliminate all V-shaped crotches. In such a case, a person may cable the two branches together and put a bolt through the tree toward the base of the crotch.
9. For shade and street trees, it is desirable to have a clear, clean trunk at least 8 to 10 feet high.
   a. This may require the removal of branches to get this high head.
   b. If many branches need to be removed for this, it may be desirable to spread this pruning over two to four years in order to keep from exposing the tree

trunk to sun scald.

c. A limb that is four feet off the ground now will always be four feet above ground. It will not rise as the tree grows taller.

10. A tree can be encouraged to grow more compact by removing the terminal buds of side limb~~s~~ to increase branching.

11. The center of the tree may need more light and air circulation, which is referred to as opening the crown.
    a. Remove some branches at a crotch to let in more sunlight.
    b. Also remove all inward-growing branches since they will not get the needed sunlight to grow properly and even if they do, they will probably rub against another branch.

12. One rule that should be followed religiously is "when pruning cut close to the trunk or main branch and leave no stub".
    a. This is so the wound will heal.
    b. If a stub is left the tree cannot cover it and it becomes an entry for insects and diseases.

13. There is a special method that should be followed in removing large branches from a tree.
    a. A branch may usually be considered large if over four inches in diameter at the place where the cut is to be made.
    b. If, in removing such a branch, a person were to just start sawing the weight of the branch would cause it to fall before the saw cut goes completely through. As it falls it would pull a long strip of bark from the trunk, leaving a large, ugly wound to be easily infected. To avoid such damage make a first cut a foot or two away from the trunk by sawing from the underneath side upward into the branch 1/3 or so of the diameter. The second cut should be a downward cut a few inches farther away from the trunk. Saw until the limb snaps off. The stub is then removed by making a shallow cut from the under

side, flush with the trunk, then sawing down from the top as close to the trunk as possible.

14. All cuts, wounds, or decayed areas over one inch in diameter should be coated with a tree-wound dressing. There are various "home-mixes" that are used for this purpose, and even though they may be satisfactory, it is advisable to purchase the specially prepared formulas for this purpose. Too many times, substitution with a home mix will reduce the effectiveness.

B. Evergreens drop their leaves, but not all at once. Many of the larger evergreens do not readily make new growth after pruning. Therefore, one aim is to keep as much as possible of the foliage undamaged.

1. Different evergreens should be pruned at different times:
    - a. Those that do not branch out readily after pruning, such as the spruces and pines, should be pruned in the spring while the growth is still in the early stages.
    - b. Hemlock, taxus and junipers can be trimmed lightly almost any time, but late spring is preferred. Heavier pruning is best done just before growth starts in the spring.
    - c. Flowering evergreens that go into winter with the flowering buds already formed (rhododendron, azaleas, laurels, pieris, etc.) are pruned immediately following flowering.
    - d. Those, like hollies, that produce flower buds on the current season's growth should be pruned during the dormant period or in early spring just before new growth begins.
2. The first, spruces and pines, produce branches in whorls around the branches or trunk.
    - a. The growth begins in the spring from buds formed the previous year.
    - b. The early growth consists of light-colored shoots called candles.

   c. The central bud usually makes the largest candle.
   d. All candles grow at a rapid rate, then the growth for that season ceases.
   e. To keep the plant compact and restrict the plant's size, remove one-half to two-thirds of each candle. This should be done while the candles are soft enough to be snapped off with two fingers and before the needles form. Then new buds will have time to form and the stubs do not die. The following year's foliage will be more dense and compact than if the candle had been allowed to grow to full length.
   f. For more drastic pruning of these trees, remove the entire central leader of each branch, causing the remaining ones to bush out.
   g. The tree's central leader should not be cut, but if by some reason (damage, disease, etc.) it is removed, one of the branches in the nearest whorl must be tied upright to the leader until it stays upright in place of the leader removed.

3. Some evergreens, instead of sending out buds at the end of the branches, send out shoots from all over their branches. The more common examples are hemlock, taxus and juniper.
   a. It is important that these plants be allowed to grow to their natural shape and not sheared into one of the many geometric designs such as a pyramid, globe, etc. Shearing gives a plant a harsh, formal, unnatural appearance. In order to avoid this stiff, formal look use pruning clippers to reach inside the outline of the plant and clip each limb off at a point directly in front of a small branchlet. The foliage on this branchlet will hide the new cut and gives a more natural appearance to the plant. However, this method is more time-consuming.
   b. If a person insists on the faster shearing method, it should be done before

early summer so that new growth will soon cover the cuts and have adequate time to mature before winter weather.

4. Broadleaved evergreens such as boxwood and the Japanese hollies can withstand considerable cutting and are frequently used in formal hedges and sheared to the desired shape. This use is one of the few instances when shearing is done without disfavor.
5. Shrubs such as rhododendrons, azaleas, and laurels can be pruned by removing the central bud of the cluster formed on the tip of the branch. This encourages the side buds to spread out more. On flowering evergreens such as rhododendrons, remove all developing seed heads as early as possible to avoid the strength of the plant being wasted in the production of seed instead of growth or the production of flowers for next year.

C. Deciduous shrubs are perhaps one of the easiest so far as determining when to prune.
  1. Shrubs that bloom in the spring should be pruned immediately following blooming.
    a. These flowers are produced on wood produced the previous year.
    b. By being pruned immediately after flowering they are given a maximum period of time to produce more flowering wood for next year without sacrificing any blooms the current year.
  2. Shrubs that bloom during the summer or fall produce flowers on wood grown that same year. These plants should be pruned in early spring before growth starts.
  3. One of the basic principles to keep in mind is to prune to natural shape and character of the shrub.
    a. First remove all dead, damaged or diseased portions. Also remove any branch that rubs on another.
    b. When an established shrub has grown long and "leggy" it may need tightening up. Cut back the offending stems low to the ground to make the new growth that way.
    c. Many mature shrubs tend to have an ex-

cess amount of twiggy growth at the tips of the branches. The result is that light cannot penetrate to the center of the plant. This dense, twiggy growth should be removed by cutting the offending parts back to varying depths.

   d. Remove all seed pods as soon as they start to form. All nourishment put into producing seeds restricts flowering wood for next year.

4. In time, shrubs get old; the stems lose their vigor, flowering decreases drastically, and the plants take on a rangy, unkempt appearance; this calls for complete removal of the old growth, as close to the ground as possible.
   a. This is normally not done in any one year but spread out over three years, one-third each year.
   b. This permits vigorous new shoots to replace the old, resulting in an attractive blooming plant once again.
5. Generally it is wise in pruning shrubs to remove some canes at ground level to reduce the plant's height, thin it, and encourage new canes to grow so as to have good looking foliage as well as more and better bloom. By pruning in this manner the shrub will keep its natural shape.
6. Do not prune shrubs by cutting off the top in a straight line or rounded shape.
   a. This totally destroys the natural shape of the plant and encourages dense, thick growth at the top as well as bare stems at the bottom, making the plant look like so many broom sticks stuck into the ground.
   b. The desired appearance for deciduous shrubs is one with branches close to the ground with a spreading and often slightly drooping top.
7. When a shrub requires close shearing annually or more frequently, in order to keep it the desired size, it is in the wrong location. Replace it with a shrub that makes lower growth.

8. With shrubs that produce a crop of fruit (berries) great care must be taken in pruning.
    a. They should not be pruned so heavily as flowering shrubs that do not produce berries.
    b. Light pruning should be done when the plant has completed flowering.
    c. Remove a few of the oldest canes at ground level and thin the top branches, where crowding occurs, to allow light to reach the center of the plant and to show fruit that would otherwise be concealed by the dense foliage.
    d. Some shrubs in this category are certain varieties of viburnums, hawthorns and privets, winterberries (*Ilex verticillata*), Japanese barberry, and pyracantha (evergreen).
9. There is a group of several shrubs that are grown because of the fact that the stems have a brilliant color.
    a. This stem coloration is the most brilliant on new wood.
    b. For this reason heavy pruning should be resorted to yearly, in order to encourage an abundance of new wood.
    c. Some plants in this group are the shrub dogwoods (*Cornus alba*, *C. stolonifera* and *C. amomum*) and *Kerria japonica*.

D. Trimmed hedges are more appropriate for formal gardens and are likely to be out of keeping in an informal landscape.
    1. The branches of hedge plants need continual trimming to force a dense growth of twigs and foliage.
        a. Some of the more rapid-growing plants may need trimming three or four times during the growing season.
        b. The last trimming during the growing season should be done no later than early September. Late pruning induces new growth that rarely becomes hardened enough to withstand severe winter weather.
    2. One of the most common mistakes with hedges

is that they are allowed to grow to the desired height or even higher before beginning to shape the hedge.

  a. A good hedge is grown slowly and cut back at least six inches each time it grows a foot.
  b. The sides are cut proportionately.

3. In hedges, do not let the top get wider than the bottom, as this shades the lower branches so they never achieve their full vigor. The sides can be kept vertical, the top can be made more narrow than the bottom, or the top can be rounded or flat.
4. For a hedge that has become old and been neglected, the owner has two choices:
    a. Cut it back six inches more on the top and sides than is desired for the finished hedge. Let it grow a new twiggy outside layer in a few easy stages.
    b. Cut it back completely within 6 to 8 inches of the ground and start training it over.
5. Evergreen hedges may need to be handled differently than deciduous hedges.
    a. Such plants as boxwood and the small-leaved hollies can withstand rather severe pruning.
    b. Most other broadleaf types should be trimmed back just enough to keep any wayward branches in line and achieve the desired shape.
    c. Remember to cut back to a whorl of buds or to small branches on active wood.
6. Needle-leaved evergreens of the fine-twigged sorts such as taxus, hemlock, and junipers, can withstand fairly heavy pruning or shearing.
7. The whorled-growth types such as pines, spruces, and firs should have the lead bud or shoot on the tip of each branch removed each year.

E. Some vines grow vigorously and need frequent pruning.
    1. Pruning of woody vines consists of thinning them out and heading them back to keep them from overgrowing their bounds.

2. Flowering vines that bear flowers on the previous year's wood are usually spring-blooming and should be pruned immediately following blooming. Remove enough old wood that the vine will be forced to produce new wood for an abundance of blooms next year.
3. Vines that bear flowers on the current season's wood should be cut back in autumn or early spring before growth begins.

F. Root pruning is practiced for several reasons.

1. Root pruning can be practiced on deciduous shrubs to reduce top growth and encourage an increased production of flowers and fruit.
    - a. The preferred time is after flowering.
    - b. With a spade, make a circle on the soil 2/3 of the distance from the trunk to the outer tips of the branches.
    - c. Dig the spade into the soil to a depth of ten to twelve inches, severing the roots.
2. This same procedure can also be used for evergreens.
    - a. The best time of year to root-prune is in the spring just as the buds begin to swell.
    - b. In all cases, pay particularly close attention to see that a root-pruned plant is well watered during the year, because of the reduced root growing area.
    - c. If a plant is located in a dry spot or has been growing there for five or more years, make alternate cuts with the spade so that one-half the roots are pruned the first year. Prune the other roots the following spring.

G. For the pruning job to be done correctly and as easily as possible, the right tools must be used.

1. Whenever tools are acquired, make sure they are good ones. Keep them sharp and oil them to prevent rust.
2. If a plant is known or suspected to have a disease, clean the cutting parts with a mixture of one part Clorox to nine parts water or with 70 percent denatured ethyl alcohol. Clean them before moving to another plant.

3. Some tools that may be helpful are named in the following list:
    a. Hand pruners. There are two basic types: One type works like a pair of scissors; the other type has a cutting blade which cuts down on a bed of soft metal.
    b. Long-handled pruners (called loppers). These are used for cutting heavier branches.
    c. Pole pruners. These enable a person to stand on the ground and reach up to cut off branches 12, 15, or more feet high. They are effective on small branches only, but still are very useful.
    d. Saws are necessary for branches too large to be cut with shears. The saws are made with especially coarse, wide-set teeth. Although not required, power saws -- including chain saws, gasoline or electric driven--make the job much easier.
    e. For trimming formal hedges, a set of hedge trimmers is necessary. Here again power hedge trimmers are light in weight and easy to use.
    f. Tree paint should always be kept on hand. It is available in spray cans or cans for brushing.

III. Mulching. Mulches are real labor-savers and one of the gardener's very best aids.

A. Advantages of mulches are many: they prevent weed growth, reduce the need for watering, increase the structure and water-holding capacity of the soil, add nutrients as they decompose, eliminate cultivation damage to shallow roots, keep the plant roots cooler stimulating more growth, prevent soil erosion, and cause more even soil temperature in winter.

B. The mulch a person should use is determined largely by what is cheap and readily available.
  1. The choices may include straw, hay, corncobs, cornstalks, shredded tobacco stalks, sawdust, shredded bark, peat moss, wood

chips, pine needles, spent hops from breweries, leaf mold, excelsior, well rotted manure, compost and grass clippings.

2. Some of these materials are coarse and unkempt looking but they can still be used under bushes and in other non-conspicuous areas, or it may be possible to camouflage coarse materials with a layer of fine-textured mulch.
3. Some mulches are subject to being blown away by wind and need anchoring to hold in place.
4. Some materials, such as spent hops and others give off peculiar odors unless sufficiently weathered.
5. Mulches from barnyard and animal sources are liable to bring in weed or other noxious plant seeds.

C. The best time to apply a mulch is in the spring of the year after the ground has warmed up somewhat and the plant growth has started; however, it should be applied before weeds get started, before the hot sun bakes the soil, and before the long weeks of drought.

1. If it has not rained before applying the mulch, give everything a thorough watering after applying.
2. Usually mulch should be spread to a depth of three to four inches.
3. Where year-round mulching is practiced on ornamental plants, fresh material can be added to the old in the fall.

D. Organic materials that have not decomposed have a tendency to deplete the soil of nitrogen in the decomposition process.

1. The bacteria which cause the breakdown must have nitrogen.
2. Eventually this nitrogen is returned to the soil.
3. To compensate for this temporary tie-up, mix ammonium nitrate or nitrate of soda with the mulch at the rate of one or two handfuls per wheelbarrow load.

E. Peat moss is acid in reaction and especially useful for acid-loving plants, such as rhododendrons and azaleas.

1. It should be well moistened before using.
2. When applied as a covering for soil it will form a crust during extended dry periods, and when it does rain this crust will shed water and prevent water from soaking into the soil beneath.
3. For this reason a person may choose to mix the peat moss with surface soil to offset this hindrance.

F. Partially decomposed sawdust looks attractive, will not blow about in the wind, will not absorb moisture from the soil, allows raindrops to penetrate slowly into the soil, and as it decays it adds its own richness to the soil. (Contrary to popular belief, sawdust does not make the soil acid.)

G. Grass clippings can make an excellent mulching material. Be careful not to apply them too thickly, as they will heat up if this is done.

H. Compost.

1. Every gardener or homeowner should consider having a compost heap, an excellent source of humus which is needed by all soils.
2. It should be located in an inconspicuous location.
3. Make a bin, with at least three sides made of stone, wire, cement blocks, or wood panels; the fourth side should be removable for added ease in removing the material.
4. Green waste: leaves, stems, etc., are put in the bin in layers six to eight inches thick alternated with a one to two inch layer of soil.
5. Make a depression in the top to help hold water.
6. Water during prolonged dry spells.
7. Turn the pile occasionally with a fork to hasten decomposition. The addition of a high-nitrogen fertilizer will hasten decay, and ground limestone will help counteract any acidity.

I. In addition to organic mulches there is a wide variety of inorganic materials used for mulches.

1. Black plastic film is excellent but rather offensive to the eye.
    a. It can be covered with a material more eye-appealing.
    b. It prevents weed growth, conserves moisture, and absorbs heat from the sun, warming the soil early in the spring.
2. Stones also make an excellent mulch around ornamental plantings. Here again there is a wide variety of choices available: flat, wide stones placed together, beach pebbles, river gravel, pea gravel, marble chips, and others.

J. Although not truly mulches, a like effect can be secured from ground cover plants; English ivy, vinca minor, periwinkle, and ajuga are only a few of the handsome choices available for this purpose.

K. The question is not whether to mulch or not to mulch, but which mulch to use.
1. The answer will probably not be just one but several choices for different areas or purposes.
2. When used properly under ornamental plants, they unite plantings and help to put a finishing touch to an attractive picture.

IV. Insect and Disease Control

A. Insects and diseases do not damage many ornamentals if they are kept in a healthy condition by watering, pruning, fertilizing and mulching.
1. Preventive spraying is necessary when there is reason to believe that plants are likely to be attacked by a certain enemy.
2. Control treatment is necessary when the attack occurs.

B. The list of plant enemies is long, as is the list of insecticides and fungicides to prevent or treat these enemies.
1. One chemical may control only one or few pests; another may control numerous pests.
2. It is not practical for a gardener to stock

all chemicals available in anticipation of trouble.
  a. Prevention is the only answer for some troubles.
  b. As a compromise, a person can purchase Sevin and Malathion for use against insects, plus Captan, Ferbam or Zineb for use against diseases and expect to be able to control most problems that will occur.

3. A dormant spray can be applied to deciduous plants while still dormant, early in the spring before the buds begin to open.
  a. The materials used commonly are lime-sulfur or an oil spray.
  b. Do not use these when the temperature is above 85 degrees or below 45 degrees.
  c. Oil sprays should not be used on evergreens of any type. They can damage Japanese and sugar maples as well as birches and beeches.
  d. Lime-sulfur irritates human skin and discolors paint.
  e. The dormant spray will give preventive protection against scale insects, mites, aphids and caterpillars.
4. There are several insects that damage trees and shrubs. Most of these can be controlled with the use of a dormant spray plus the chemicals (Sevin, Malathion, and Captan, Ferbam or Zineb) mentioned earlier. Keep in mind that, regardless of the material being used, be sure to follow the instructions on the label.

C. Some common insects are:
  1. Aphids. These tiny insects occur in masses on trees and shrubs.
    a. They may be white, green, gray or reddish in color.
    b. They suck the juices from the plant and are responsible for a sticky, clear substance falling from the foliage.
    c. Spray with Malathion.
    d. Ladybugs will aid in control, because they feed on aphids.
  2. Bagworms are caterpillars in small silky bags covered with fragments of the plants

they feed on.
   a. Spray with Sevin or Malathion in the spring.
   b. Also, remove the bags and burn them.

3. Borers attack many trees and shrubs by boring holes in the branches and trunks.
   a. Usually sawdust around their holes betrays their presence.
   b. The pests can be killed with a wire probe, or carbon bisulphide can be injected into the burrow, which should be closed with a putty of some type following injection. Lindane is also effective in this manner.
   c. Paradichlorobenzene crystals can be worked into the soil around the trees.
   d. The use of a systemic insecticide such as Meta-systox may prove to be an effective control.
4. Japanese beetles chew holes in the foliage of trees and shrubs.
   a. They are a metallic green beetle with coppery wings. Spray with Sevin.
   b. They can also be hand picked and dropped into a container of kerosene.
5. Leaf miners burrow inside the leaves, causing them to become spotted with translucent blotches.
   a. The birches and hollies are favorite targets.
   b. Spray with Sevin or Malathion.
6. Red spider mites are microscopic sucking insects that feed on the needles of hemlocks, junipers and other evergreens.
   a. They cause the needles to turn brown and fall.
   b. If their presence is suspected, hold a white sheet of paper beneath a branch which is suspected to be infected. Shake the branch. If these pests are present, very small spots can be seen moving on the paper.
   c. Spray with a miticide such as Kelthane.
7. Scale insects are tiny insects with a hard, scaly covering.
   a. They occur in masses on the trunks and limbs of many ornamentals.

    b. They suck the plant juices, reducing strength, which results in foliage loss and maybe death.
    c. Spray with sevin or malathion.
8. Tent caterpillars build silken tents in the crotches of many fruit and shade trees.
    a. Destroy the egg clusters in the winter.
    b. Spray with Malathion when they become active.

D. Some common plant diseases are as follows:
  1. Anthracnose is a fungus disease which causes gray, brown, black or white spots on the leaves and sometimes twigs of many trees and shrubs.
      a. This malady attacks sycamore trees in the early spring, causing the first crop of leaves to drop.
      b. Spray with Captan or Zineb.
  2. Cankers cause large sores or dead patches on twigs, branches or trunks.
      a. Cut away the infected branches, being careful to disinfect the tools after each cut to keep from spreading the disease.
      b. Some cankers are caused by bacteria, while others are caused by a fungus.
      c. Fungus cankers are treated with tree paint.
  3. Fire blight is a disease attacking pears, apples, quinces, cotoneasters, pyracanthas and many other deciduous plants.
      a. First the leaves blacken and die, followed by the entire twig or branch turning black and dying.
      b. Remove blighted twigs immediately, while sterilizing the shears between cuts.
      c. It may help to spray plants with Bordeaux mixture during the blooming period.
  4. Chlorosis is a deficiency "disease" which occurs when a plant is unable to absorb sufficient iron from the soil.
      a. The leaves turn yellow in color between the veins, which remain green.
      b. Apply chelated iron to the soil.
  5. Powdery mildew is a fungus disease which coats the foliage with a white or gray powder.

      a. It attacks first in damp, shaded spots or in crowded quarters where there is poor air circulation.
      b. Spray with sulfur or Phattan.

V. Winter Protection

  A. Winter protection may be needed for evergreens such as azaleas, boxwood, rhododendron and others especially in the Northern parts of Kentucky.
    1. Drive stakes into the ground around the plant, leaving a space of six inches between the plant and stake.
    2. Staple burlap to the stakes around the plant.
    3. In most cases the top can be left open.
    4. Snowfencing also makes an effective windbreak for this purpose.
    5. Such a practice is to protect the foliage against dehydration.

  B. A three to four inch layer of mulch on the ground beneath the plant will help to prevent deep freezing of the soil, permitting the plant to draw up moisture all winter long.

  C. A heavy snowfall can cause plants to bend down out of shape.
    1. To help prevent this, wrap the plant with heavy twine in a spiral fashion.
    2. In locations where this will detract from the appearance of the plant, the only other alternative is to go out and knock the snow off with a broom or light stick.
      a. Start at the bottom and work up.
      b. Do this as soon as possible after the snow stops falling.
      c. If allowed to partially thaw and then freeze back, damage to the plant could result when removal is attempted.

VI. Structures

  A. All structures are a part of the landscape. The home, garage, tool-storage shed, barn, etc., are all a part of the landscape and require maintenance in order to be an asset to the total picture instead of a liability.

B. Some types of wood used today such as redwood or cedar need no staining or painting. Age only adds to their charm and makes a more natural setting and background.

C. Other woods will last longer, split less readily and hold paint better if it is treated with a preservative.

D. Two wood preservatives that can be brushed on are copper naphthenate and pentachlorophenol.

E. For a natural effect, weathered wood can be secured through treatment with weathering oil.
   1. This is demonstrated by old barn siding, rail fences, etc.
   2. Building panels are available commercially that are made to look like rough sawn lumber.

F. As for painting surfaces exposed to the elements, one of the new exterior latex paints should prove satisfactory.
   1. Be careful about painting large surfaces such as a wall, with a high gloss paint.
   2. Do not paint surfaces that will last without it. For example, tree trunks, rocks, masonry edging, etc., will last just as long without paint as with it. They do not look natural when painted. In addition, they usually do not hold paint well and due to the "peeling" that takes place usually require painting at least once each year.

G. In a great many cases, exterior wood stains are much better than paint.
   1. They are available in a wide range of wood tones and rainbow hues.
   2. In addition to coloring the wood, they seal it without concealing the innate beauty of the wood as does paint.
   3. They usually wear better and longer than paint.
   4. They help protect the wood against decay, mildew, drying and cracking by penetrating the wood fibers.
   5. Some are clear and do not obscure the wood grain.

6. Others are more opaque and partially obscure the grain, but give more color.
7. Two coats may be needed to give a uniform appearance.
8. A good stain job becomes more beautiful as it ages.

H. All surfaces to be painted must be free of dirt, oil, scale, old paint that is loose or scaling, and other impurities.

I. For metal surfaces to be painted, a wire brush, steel wool or sandpaper can be used to remove rough areas.
   1. A solvent such as mineral spirits can be used to remove oil and grease.
   2. The surface should then be thoroughly rinsed.
   3. A primer should then be applied.
   4. Good primers will have either zinc-dust, red lead, zinc yellow, blue lead, oxide of iron, or zinc dust oxide as one of the components.

J. Before painting galvanized products, allow them to weather at least six months, wash with a vinegar solution and rinse thoroughly, or use a commercial primer.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. The landscape requires proper maintenance if it is to remain attractive.
   2. The plants used in landscaping have different requirements as far as fertilizing is concerned. Some require fertilizing every year, others every two or three years, while others grow well with only occasional fertilization. Some plants require soil amendments to help maintain an acid condition.
   3. Pruning, as required by plants, does not consist of simply shearing them into cubes, cones, globes or other geometric forms.
   4. The proper use of mulches will reduce maintenance chores while contributing to the

appearance and health of the plants in the landscape.

5. Plants are subject to attack by insects and/or disease. Many of the more common enemies are easily controlled by readily available insecticides or fungicides.

B. Things to be brought out by class members:
   1. Their experiences with all aspects of maintenance.
   2. Ability to recognize and identify diseases and insects.
   3. Good and bad experiences they have had with insects and diseases and their control.

II. Conclusions

A. Plants that are kept healthy by proper fertilization, pruning, mulching, etc., are much less apt to be injured by diseases or insects.

B. The best fertilizer for ornamental shrubs is one containing nitrogen, phosphorus and potassium.

C. Do not prune plants to make them conform to some geometric shape; prune for a purpose beneficial to the plant.

D. Beware of practices that will stimulate new growth so late in the growing season that it does not have time to mature, thus subjecting it to winter killing. Late fertilizer applications and late pruning are two such practices.

E. Not all maintenance jobs can be done by the homeowner. Some, such as removing large trees or spraying large trees, may require the services of a professional with the proper equipment.

III. Enrichment Activities

A. Provide opportunity for practical experience in fertilizing, pruning, mulching, insect and disease control, and preparing plants for winter.

B. Conduct tours to observe landscape maintenance practices.

IV. Suggested Teaching Materials

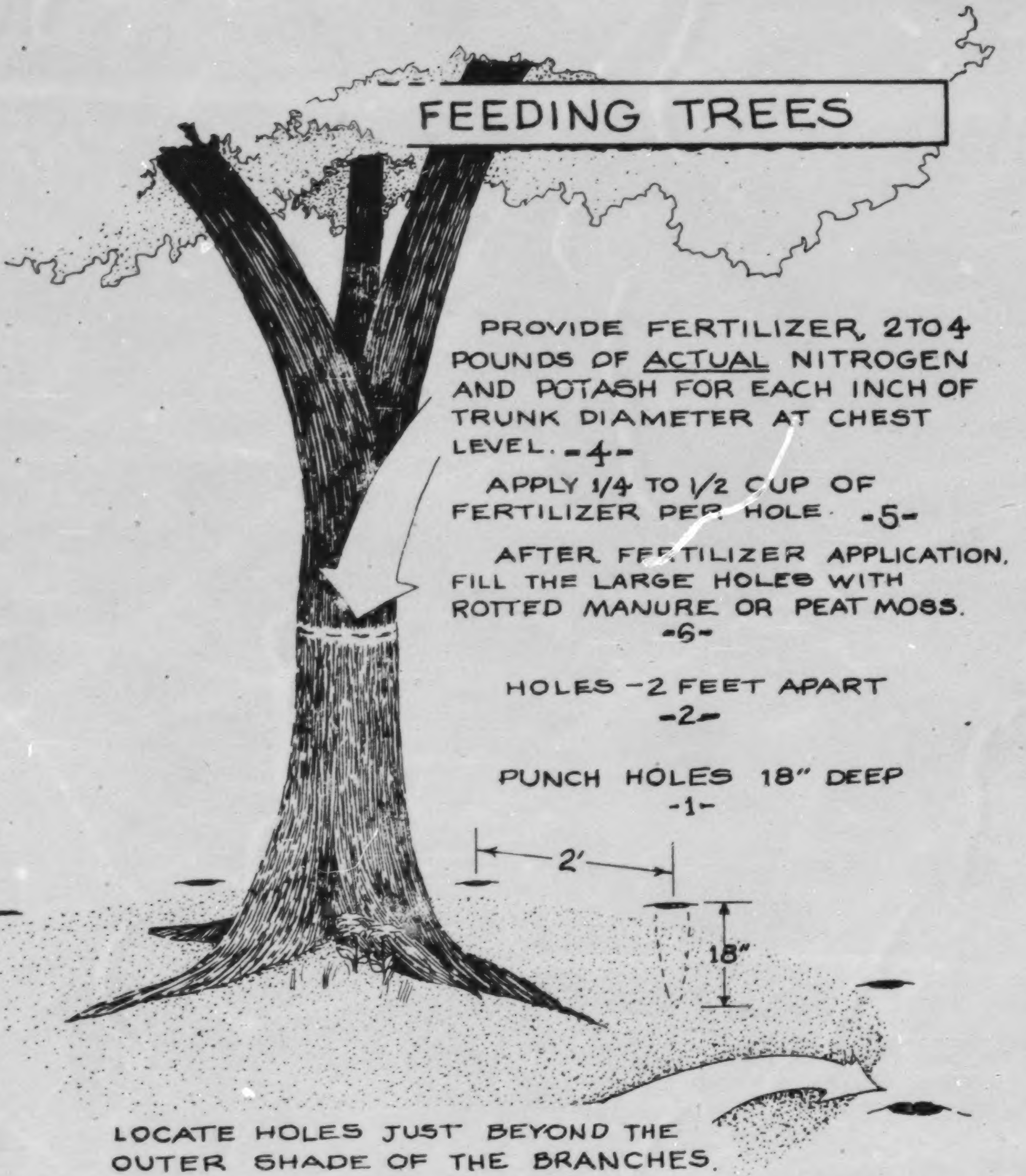
A. References

1. Approved Practices in Beautifying the Home Grounds, pp. 181-220.
2. Better Homes and Gardens New Garden Book, pp. 98-99, 346-358.
3. Evergreens, Time-Life Books, pp. 49-65.
4. Flowering Shrubs, Time-Life Books, pp. 51-63.
5. Grounds Maintenance Handbook by H. S. Conover, pp. 67-286.
6. How To Prune Almost Everything by John Philip Baumgardt.
7. Landscape Maintenance by Scott Wilson, VEP, pp. 5-11, 15-19, 22-30, 34-36.
8. Landscape Maintenance and Establishment, A Teacher's Manual, Penn State University, pp. 11-27.
9. Landscaping Your Home by Wm. R. Nelson Jr., pp. 121-127.
10. Maintaining The Home Landscape, Horticulture Unit, U of K.
11. Minimum Maintenance Gardening Handbook by Walter F. Bruning, pp. 81-256.
12. Outdoor Living, Planning, and Construction Guide, Midwest Plan Service, Iowa State University, Ames, Iowa, pp. 42-43.
13. Plant Pruning in Pictures by Montague Free, pp. 11-61, 78-202.
14. Shrubs For The Home Grounds, Correspondence Course No. 137, Penn State University, Lesson 2.
15. The Care and Feeding of Trees by Murphy and Meyer, pp. 47-126.
16. The Complete Gardener, pp. 138-149, 154-157.
17. The Pruning Manual by Edwin F. Steffek, pp. 1-55, 72-84, 100-104, 112-130.
18. The Pruning of Trees, Shrubs and Conifers by George E. Brown.
19. Trees, Time-Life Books, pp. 49-63.
20. Trees For The Home Grounds, Correspondence Course No. 135, Penn State University, Lesson 2.
21. Vines, Ground Covers, and Espaliers, Correspondence Course No. 140, Penn State University, pp. 7-10.

B. Resource Personnel
  1. Cooperative Extension specialists
  2. Landscape nurseryman
  3. Local sources
  4. For specific personnel consult Vo-Ag Directory of Resource People in Kentucky.

C. Audio-Visuals
  1. Masters
    - -1 Feeding Trees
    - -2A Insect Control Recommendations
    - -2B Chemical Control of Turfgrass Diseases
    - -2C Conversion Table for Mixing Chemicals
    - -3 Fertilizing Evergreens
    - -4 Feeding Deciduous Shrubs and Hedges
    - -5 Feeding Ground Covers and Vines
    - -6 Tree Pruning Points
    - -7 Pruning Evergreens
    - -8 Pruning Shrubs
    - -9 Pruning Hedges
    - -10 Watering Evergreens
    - -11 Winter Protection
    - -12 Mulching Materials
  2. Filmstrips from Vocational Education Publications, California State Polytechnic College, San Luis Obispo, California.
    a. Fertilizing Ornamental Plants
    b. Controlling Pests of Ornamental Plants
    c. Elements of Pruning
    d. Pruning Ornamental Shrubs

FEEDING TREES



PROVIDE FERTILIZER, 2 TO 4 POUNDS OF ACTUAL NITROGEN AND POTASH FOR EACH INCH OF TRUNK DIAMETER AT CHEST LEVEL. -4-

APPLY 1/4 TO 1/2 CUP OF FERTILIZER PER HOLE. -5-

AFTER FERTILIZER APPLICATION, FILL THE LARGE HOLES WITH ROTTED MANURE OR PEAT MOSS. -6-

HOLES - 2 FEET APART -2-

PUNCH HOLES 18" DEEP -1-

LOCATE HOLES JUST BEYOND THE OUTER SHADE OF THE BRANCHES. -3-

R. GILMORE, MATL LAB for INST., UK

SELECTED INSECTICIDES FOR THE CONTROL OF LAWN INSECTS

MATERIAL TO USE	DOSAGE PER 1,000 SQUARE FEET								
	ALDRIN			CHLORDANE			HEPTACHLOR		
INSECT	2.5% DUST	2% GRANULES	25% WETTABLE POWDER	5% DUST	5% GRANULES	40% WETTABLE POWDER	2½% DUST	2½% GRANULES	25% WETTABLE POWDER
GRUBS	2-3/4 LBS.	3½ LBS.	4½ OZ.	5 LBS.	5 LBS.	10 OZ.	2-3/4 LBS.	2-3/4 LBS.	4½ OZ.
SOD WEBWORMS, WIREWORMS	2-3/4 LBS.		4½ OZ.	2½ LBS.	2½ LBS.	5 OZ.	2-3/4 LBS.	2-3/4 LBS.	4½ OZ.
CHINCH BUGS				5 LBS.	5 LBS.	10 OZ.			
LEAFHOPPERS*				1 LB.		2 OZ.			

*TO DETERMINE DOSAGES PER ACRE, MULTIPLY THE ABOVE RECOMMENDATIONS BY 43.

SOURCE: Lawn Insects and How To Control Them, Home and Garden Bulletin 53, USDA.

Adult 110-7-2A

PPA–1
(Formerly Misc. 372)

CHEMICAL CONTROL OF TURFGRASS DISEASES— 1974

A. S. Williams, Extension Plant Pathologist

READ LABELS CAREFULLY AND USE CHEMICALS ACCORDING TO DIRECTIONS. SEE A DOCTOR IF SYMPTOMS OF ILLNESS SHOULD OCCUR DURING OR AFTER USE OF PESTICIDES.

Disease	Turfgrass	Chemical[1]	Rate[2] 1000 sq ft	Season and Interval of Application
ANTHRACNOSE *Colletotrichum graminicola*	Bentgrasses Bermudagrasses Bluegrasses Fescues Ryegrasses	Fore 80% WP	4-6 oz.	July-August 7-14 days
COPPER SPOT *Gloeocerospora sorghi*	Bentgrasses	See Sclerotinia Dollarspot		
FAIRY RINGS	All turfgrasses	Methyl bromide* or Formaldehyde		
FUSARIUM BLIGHT *F. roseum*	Bentgrasses Fescues	Tersan 1991-50% WP	5-8 oz	April-September 7-10 days
	Bluegrasses			July-August 7-10 days
HELMINTHOSPORIUM DISEASES				
(a) Melting-out *H. vagans*	Bluegrasses	Acti-dione thiram or	4 oz.	April-June 7-14 days
		Daconil 2787 75% WP or	4 oz.	
(b) Zonate Eyespot *H. giganteum*	Bentgrasses Bermudagrasses Bluegrasses Fescues	Dyrene 50% WP or	4-6 oz.	July-August 7-14 days
	Ryegrasses	Fore 80% WP or	4 oz.	
(c) Leaf Spot *H. sorokinianum*	Bentgrasses Bluegrasses Fescues Ryegrasses	Tersan LSR 80% WP or	3-4 oz.	July-August 7-14 days
(d) Red Leaf Spot *H. erythrospilum*	Bentgrasses	Zineb 75% WP	2-4 oz.	April-August 7-14 days
(e) Blight *H. dictyoides*	Fescues Ryegrasses			April-June 7-14 days
(f) Brown Blight *H. siccans*	Fescues Ryegrasses			April-June 7-14 days
POWDERY MILDEW *Erysiphe graminis*	Bermudagrasses Bluegrasses Fescues	Acti-dione-thiram or Acti-dione TGF	4 oz. 2 oz	July-September 7-14 days

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Disease	Turfgrass	Chemical[1]	Rate[2] 1000 sq ft	Season and Interval of Application
PYTHIUM BLIGHT	Bentgrasses	Koban 35% WP	4 oz.	5-7 days in
	Bermudagrasses	or		hot humid
P. aphanidermatum	Bluegrasses	Tersan SP 65% WP	4 oz.	weather
P. spp.	Fescues			
	Ryegrasses			
	Zoysia			
RED THREAD	Bentgrasses	Acti-dione thiram	4 oz.	May-June and
	Bluegrasses	or		August-September
Corticium fuciforme	Fescues	Tersan LSR 80% WP	6 oz.	10-14 days
	Ryegrasses			
RHIZOCTONIA	Bentgrasses	Acti-dione thiram	2-4 oz.	July-September
BROWN PATCH	Bermudagrasses	or		5-10 days
	Bluegrasses	Daconil 2787 75% WP	4 oz.	
R. solani	Fescues	or		
	Ryegrasses	Dyrene 50% WP	4-6 oz.	
	Zoysia	or		
		Fore 80% WP	4 oz.	
RUST	Bluegrasses	Acti-dione-thiram	4 oz.	July-August
		or		7-14 days
Puccinia graminis		Zineb 75% WP	2-4 oz.	
STRIPE SMUT	Bentgrasses	Tersan 1991-50% WP	6 oz.	October or in
	Bluegrasses			early spring.
Ustilago striiformis	Fescues			Add water after
	Red top			application.
	Ryegrasses			
		Acti-dione-thiram	2-4 oz.	
SCLEROTINIA	Bentgrasses	or		June-October
DOLLARSPOT	Bermudagrasses			7-14 days
	Bluegrasses			or as needed
S. homoecarpa	Fescues	Daconil 2787 75% WP	2-4 oz.	
	Ryegrasses	or		
	Zoysia	Dyrene 50% WP	3-6 oz.	
		or		
		Mertect 60% WP	2 oz.	
		or		
		Tersan 1991 - 50% WP	1 oz.	
		or		
		Tobaz 26.2% WP	2 oz.	
SNOW MOLDS	Bentgrasses	Dyrene 50% WP	4-6 oz.	Fall-Spring
	Bermudagrasses	or		2-6 weeks
Fusarium Patch	Bluegrasses	Tersan SP 65% WP	6-9 oz.	
F. nivale	Fescues			
Typhula Blight	Ryegrasses			
T. itoana	Zoysia			
NEMATODES	All turfgrasses except bentgrass: Mix 2 pints Nemagon EC-2 or Fumazone 70E with 10-15 gallons of water and drench 1,000 sq ft of turf. Water turf immediately after application to insure penetration of nematicide into soil and to prevent toxic effects. Treat turf in spring and/or in fall when soil temperature is above 60°F. Aerifying turf before nematicide application improves results. Do not apply chemical to newly seeded area. (Treat with methyl bromide before seeding or sprigging.) Bentgrass: Use 1 pint of chemical.			

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[1] Denotes either chemical, coined name, or representative trade name. Where trade names are used, no endorsement is intended, nor is criticism implied of similar products not named.

[2] Apply in 5 gal water per 1000 square feet. Lower rates should be used in preventative programs and higher rates in corrective programs.

*CAUTION: Chemicals with this designation (*) are ex[illegible] poisonous. Read the label and heed warnings.

Issued in furtherance of Cooperative Extension work, acts of May [illegible] June 30, 1914, in cooperation with the U.S. Department of Agriculture. Charles E. Barnhart, Director of Cooperative Extension Service, University of Kentucky College of Agriculture.
Issued 11-72, 14M; 11-73, 12M

CONVERSION TABLE FOR MIXING SMALL BATCHES OF INSECTICIDE

IF MANUFACTURER INSTRUCTS YOU TO MIX THIS AMOUNT OF INSECTICIDE TO 100 GALLONS OF WATER	MIX THIS AMOUNT OF INSECTICIDE TO 25 GALLONS OF WATER	MIX THIS AMOUNT OF INSECTICIDE TO 1 GALLON OF WATER
2 POUNDS	1/2 POUND	1/3 OUNCE OR 2 LEVEL TABLESPOONS
3 POUNDS	3/4 POUND	1/2 OUNCE OR 1/4 CUP
4 POUNDS	1 POUND	2/3 OUNCE OR 1/3 CUP
6 POUNDS	1-1/2 POUND	1 OUNCE OR 1/2 CUP
1 PINT	1/2 CUP	1 TEASPOON
1 QUART	1 CUP	2 TEASPOONS
1 GALLON	1 QUART	3 TABLESPOONS
3 GALLONS	3 QUARTS	1/2 CUP
10 GALLONS	2-1/2 GALLONS	1-1/2 CUPS

3 LEVEL TEASPOONS = 1 LEVEL TABLESPOON
2 TABLESPOONS = 1 FLUID OUNCE
8 FLUID OUNCES = 1 CUP
12 FLUID OUNCES = 1 POUND
16 OUNCES (DRY MEASURE) = 1 POUND

-- GREEN THUMB (UK), APRIL 1961

Source: Instructional Materials Laboratory, University of Kentucky.

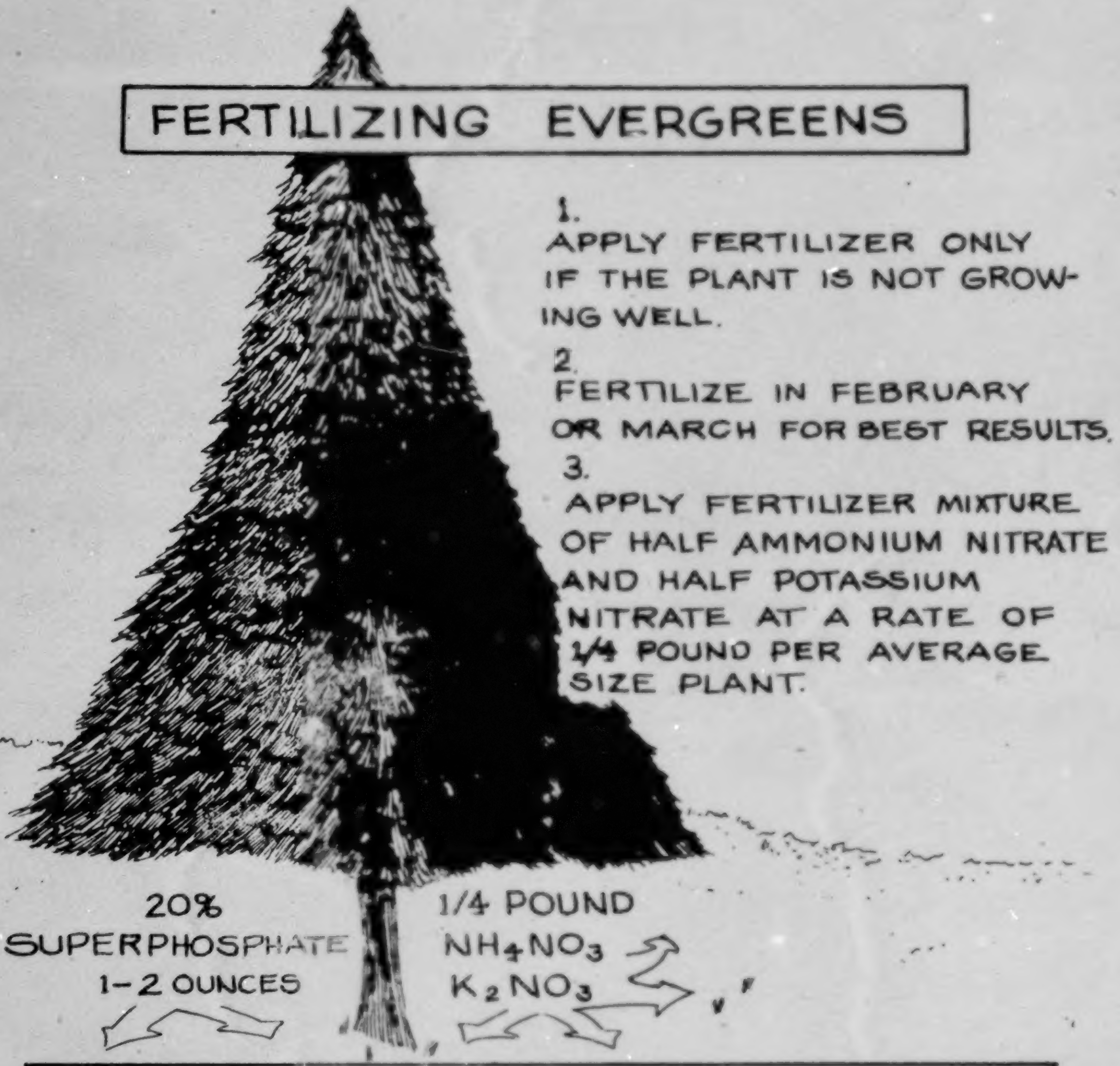
Adult 110-7-2c

FERTILIZING EVERGREENS

1. APPLY FERTILIZER ONLY IF THE PLANT IS NOT GROWING WELL.

2. FERTILIZE IN FEBRUARY OR MARCH FOR BEST RESULTS.

3. APPLY FERTILIZER MIXTURE OF HALF AMMONIUM NITRATE AND HALF POTASSIUM NITRATE AT A RATE OF 1/4 POUND PER AVERAGE SIZE PLANT.



4. IF THE SOIL IS LOW IN PHOSPHOROUS, ADD 1-2 OUNCES OF 20% SUPERPHOSPHATE PER PLANT.

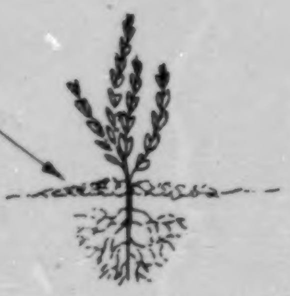
5. WORK FERTILIZER IN SOIL 1 INCH DEEP.

6. MAINTAIN ACID SOIL. MAINTAIN A LOW SOIL pH LEVEL – BELOW pH 6.0. MOST EVERGREENS ARE ACID LOVING.

R.GILMORE, INST. MATL. LAB., UK

[redacted]

FEEDING DECIDUOUS SHRUBS



MULCH AROUND BASE WITH ORGANIC MATERIAL.

APPLY FERTILIZER. USE 1/2 CUP OF 10-10-10 PER 1 FOOT HEIGHT (OR SPREAD)

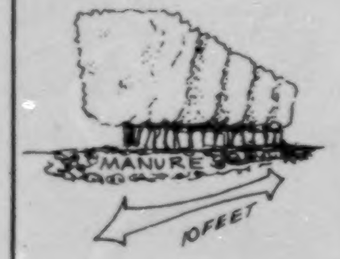
FERTILIZE IN SPRING. DO SO ONCE IN 2-3 YEARS OR AS NEEDED.

SHALLOW CULTIVATION. DO NOT DISTURB THE SOIL DEEPLY. SHRUBS ARE SHALLOW ROOTED IN MANY CASES.

FEEDING DECIDUOUS HEDGES

WINTER MULCH WITH ORGANIC MATERIAL. (MANURE) 3 INCHES DEEP AND 12-15 INCHES TO EACH SIDE OF ROW.

FERTILIZE IN LATE FEBUARY OR MARCH WITH 10-10-10 FERTILIZER, USING 1 POUND TO EACH 10 FEET OF ROW.



DO NOT FERTILIZE AFTER SECOND WINTER, UNLESS GROWTH IS VERY POOR DUE TO AN INFERTILE SOIL.

SHALLOW CULTIVATION ONLY, DUE TO SHALLOW ROOT SYSTEM.

R GILMORE, INST MATL LAB, U. K.

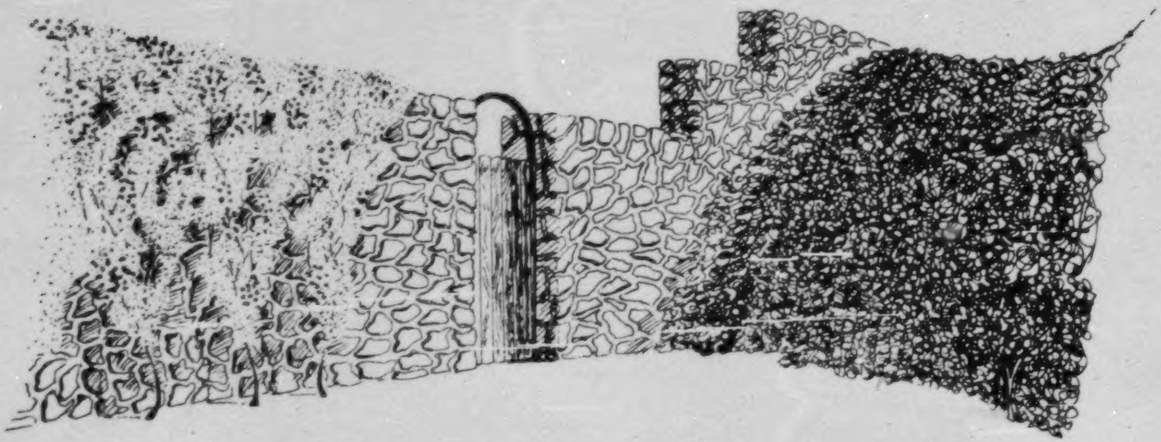
FEEDING GROUND COVERS AND VINES

USE ORGANIC FERTILIZER, (MANURE, WELL ROTTED)

FERTILIZE, USE 10-15 POUNDS 10-10-10 PELLETED FERTILIZER PER 1000 SQUARE FEET.

APPLY IN EARLY SPRING.

GROUND COVERS



VINES

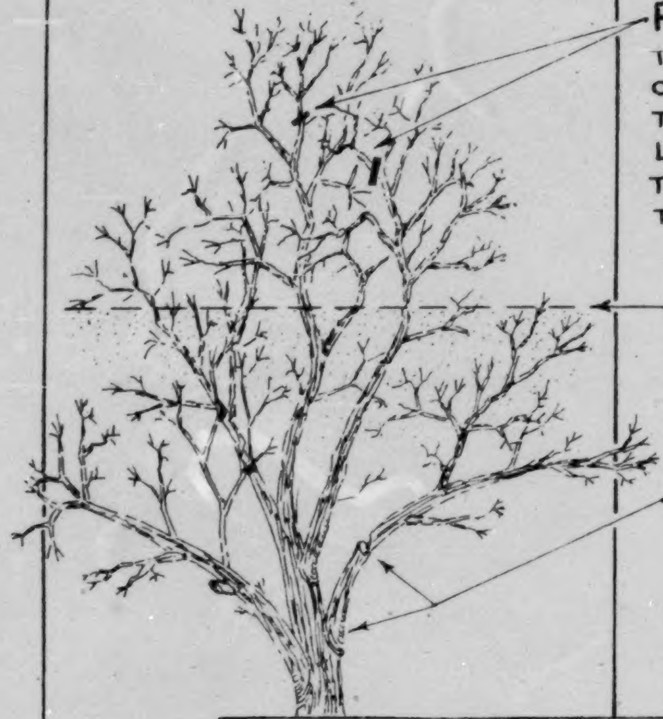
MULCH WITH ORGANIC MATERIAL (MANURE)

FOR SMALL VINES, APPLY A HANDFULL OF 10-10-10 FERTILIZER PER PLANT.
FOR LARGE VINES, USE GROUND COVER RATE.

APPLY IN EARLY SPRING.

R.GILMORE, INST MATL LAB, UK

TREE PRUNING POINTS

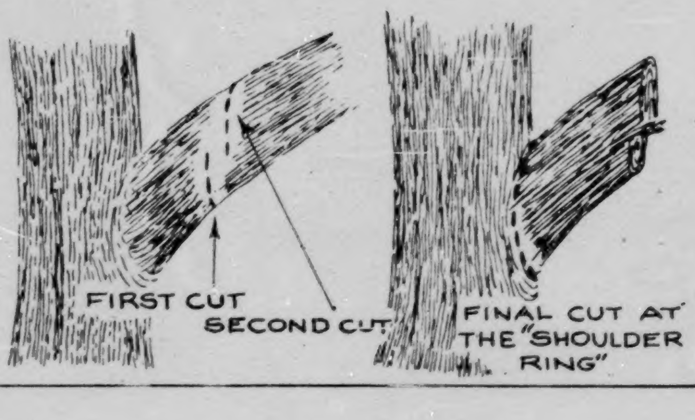


PRUNE LIMBS FROM TREES WHERE THE TOP OR SIDES ARE TOO DENSE. THIS PERMITS MORE SUNLIGHT TO PENETRATE THE TREE AND GIVE A STRONGER TREE.

NEVER TOP A TREE BY PRUNING THE TOP OFF

PRUNE BROKEN LIMBS EVEN WITH THE TRUNK.

THE CORRECT METHOD OF REMOVING A LIMB WITHOUT TEARING THE BARK


FIRST CUT
SECOND CUT
FINAL CUT AT THE "SHOULDER RING"

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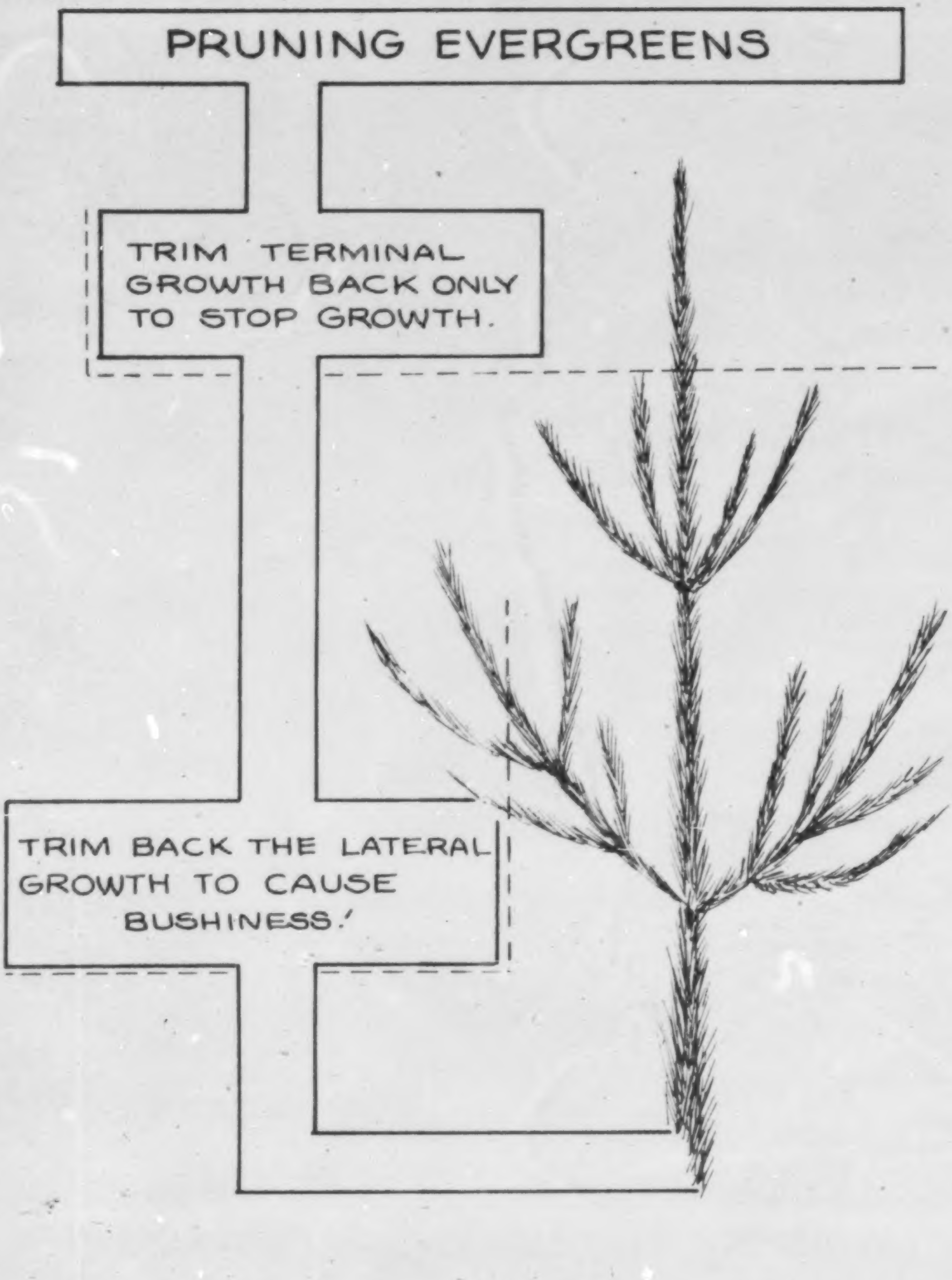
PRUNING EVERGREENS



TRIM TERMINAL GROWTH BACK ONLY TO STOP GROWTH.

TRIM BACK THE LATERAL GROWTH TO CAUSE BUSHINESS.'

Adult 110-7-7

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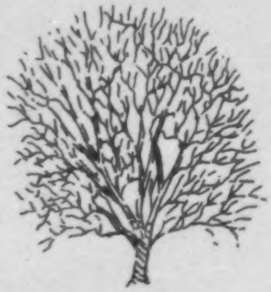
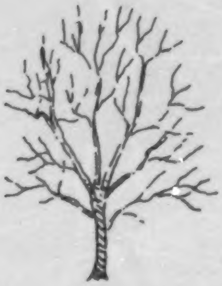
PRUNING SHRUBS

TREE-TYPE

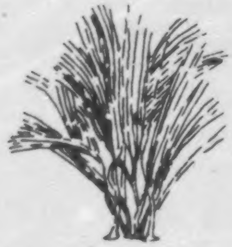


BEFORE
PRUNING

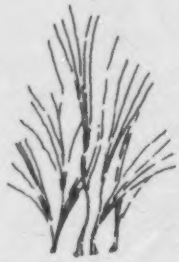


CORRECTLY
PRUNED
BY THINNING

BUSH-TYPE



BEFORE
PRUNING



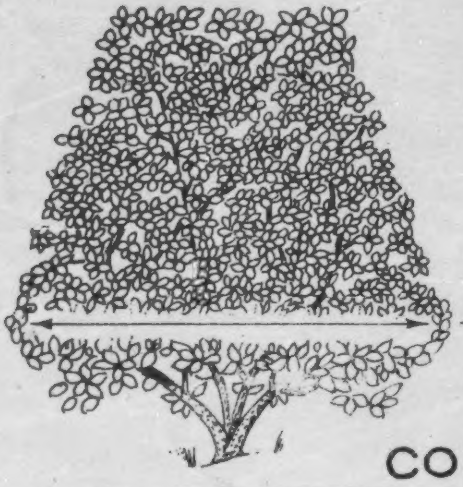
CORRECTLY
PRUNED
BY THINNING

[redacted]

Adult 110-7-8

R GILMORE, INST. MATL. LAB., U.K.

PRUNING HEDGES

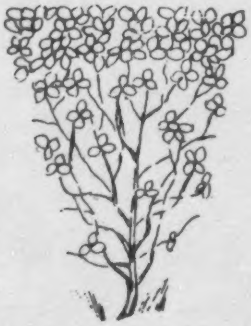


WIDE AT THE BASE
NARROW AT THE TOP

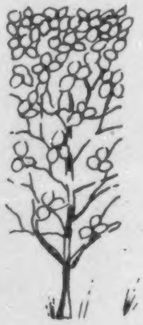
3-4 INCHES WIDER
AT BOTTOM THAN TOP

CORRECT

TOO WIDE AT THE
TOP. INADEQUATE
LIGHT



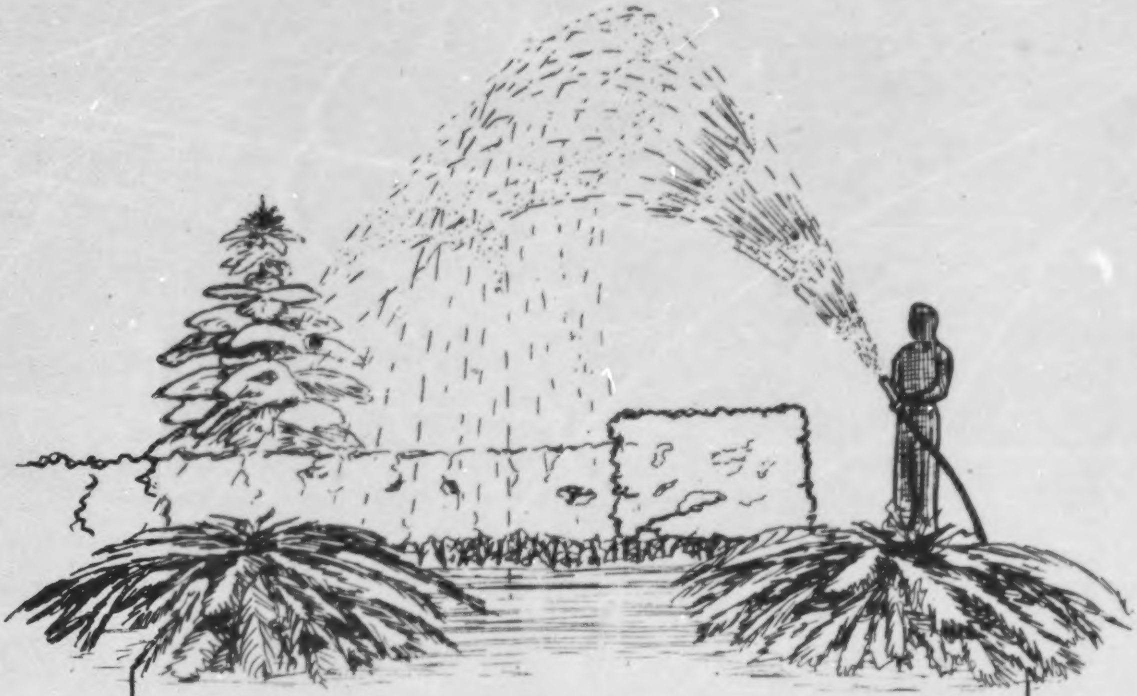
TOO NARROW
SIDES TOO THIN



WRONG

R. GILMORE, INST. MATL. LAB., U.K.

WATERING EVERGREENS



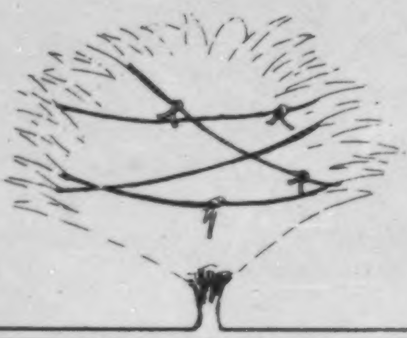
WATER EVERGREENS TO A DEPTH OF 2-3 FEET-SOAK.

IN WINTER, WATER SHRUBS ONLY WHEN TEMPERATURE IS ABOVE FREEZING. ONCE A MONTH MAY BE ENOUGH.

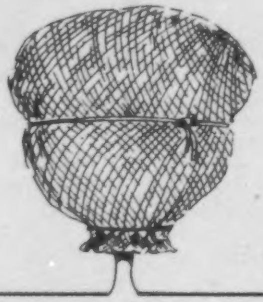
WATER EVERGREENS WHENEVER THE SOIL BECOMES MODERATELY DRY.

RG. , INST. MATL. LAB , U.K.

WINTER PROTECTION

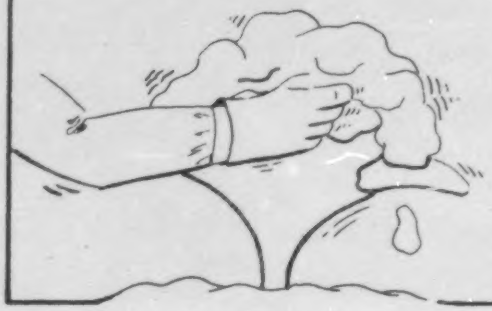


WRAP A STRING LOOSELY AROUND SOME EVERGREENS TO PREVENT BREAKING DUE TO WINTER CONDITION. DO IT ABOUT THANKSGIVING.



SOME EVERGREENS MAY REQUIRE WRAPPING IN BURLAP TO PREVENT WINTER DAMAGE.

(BOXWOODS)



SHAKE THE SNOW, ICE, ETC. FROM OTHERS AS IT ACCUMULATES. THIS RREVENTS UNNECESSARY BREAKING.

R GILMORE, INST MATL LAB, UK

MULCHING MATERIALS

Wood Chips

Ground Bark

Pine Needles

Leaf Mold

Compost

Decayed Sawdust

Coarse Peat Moss

Grass Clippings

Lesson 8

THE FLOWER GARDEN

Objective -- To develop the effective ability of homeowners to successfully establish and maintain the flower garden.

Problem and Analysis -- How can we successfully establish and maintain the flower garden?

- Reasons for a flower garden
- Planning the flower garden
- Selecting the flowers
- Culture
- Insect and disease control

Content

I. Reasons For A Flower Garden

A. Flowers, annuals, biennials, perennials, and bulbous plants, put the finishing touch on the home landscape.

B. Where flowering trees and shrubs provide color for only a short period of time, garden flowers provide color throughout the growing season.

C. The flower garden is a source of cut flowers for enjoyment in the home.

D. They can serve as fill-ins where permanent plantings have not yet grown large enough to be effective.

E. Many are easily grown; also, many are rapid growing and can provide almost instant screening.

II. Planning The Flower Garden

[redacted]

A. In planning for the flower garden, be realistic about the size; do not plant one that requires every waking moment to care for.

B. Do not consider the flowers as a separate entity but as a part of the entire garden.
  1. They are very effective when seen against one another or some other feature.
  2. They are most effective when seen against a background such as a hedge, fence or wall.
  3. Flowers are highlighted more with a dark background; a light colored background causes them to lose much of their effectiveness.

C. Logic would say to put the taller plants in the rear with the smallest in front. Basically this must be followed, but it will be more interesting if this is not followed rigidly; use a little variety in plant height.

D. The flower bed should be six to eight feet wide. This allows room for a sufficient number of varieties to provide color all during the growing season.

E. An informal shape will be more pleasing to the eye than one with straight lines. A flower bed with curved edges will look much more attractive; however, straight line borders can be used when all elements of the design are straight lines.

F. Too many colors or too many varieties shouldn't be used; instead, use masses of one color of one species.
  1. Group these plants together rather than scattering the individual plants here and there.
  2. As for the choice of color, that will be partially determined by individual taste.
    a. Red, orange and yellow are warm colors.
    b. Blue, green and violet are cool colors.
    c. The smaller the area, the fewer warm colors to use.
    d. Generally, cool colors in the garden give the illusion of depth while strong, warm colors make the area seem smaller, or shorter, than it actually is.

G. The public area should not contain an island flower bed, or if desired, they should be used with restraint. Sometimes a planter may be used, or they may be set among permanent plants not yet large enough to be effective.

H. Groups of spring-flowering bulbs fit well in the flower garden. They bloom early and the other flowers will help to hide their foliage as it turns brown.

I. The flower bed may consist of annuals as well as perennials, but in separate areas for ease of tillage.

J. The best location for the flower bed is to the side or rear of the house, where it can be seen from the family area within the house as well as from the private area outside the house.

III. Selecting the Flowers

A. The plants for the flower garden can be classified into one of three categories as determined by growth habits or use.
  1. Annuals complete the life cycle in one year.
  2. Biennials complete the life cycle in two years, the first year devoted to vegetative growth with flowers being produced the second year.
  3. Perennials live for three years or longer.
    a. They come back from the roots each year, as the above-ground growth is usually killed during the winter.
    b. They seldom bloom the first year but should bloom yearly thereafter if grown under favorable conditions.

B. Annuals provide color in the garden when the numbers of perennials in flower are low.
  1. They are especially useful in a new garden, as they provide quick color.
  2. They can be grown in places where perennials fail to survive.
  3. They are also a source of cut flowers for arrangements in the home.
  4. Annuals make a special contribution when grown in containers.
  5. The following table is a partial list of annuals for Kentucky gardens:

ANNUAL FLOWERS FOR KENTUCKY GARDENS

Common Name	Botanical Name	Light Requirements	Height	Color	Blooming Period	Comments
Ageratum (flossflower)	Ageratum Houstanianum	Full sun to partial shade	6"- 8"	Blue, Lavender, Pink, White	Early summer to frost	Dwarf varieties are the most popular, however there are tall-growing varieties.
Snapdragon	Antirrhinum majus	Full sun	6"- 4'	Wide range	Summer to frost	
Wax Begonia	Begonia semperflorens	Shade to partial shade	6"- 8"	Pink, red, white	Continuously	Also a very popular house plant.
Pot Marigold	Calendula officinalis	Full sun	1'- 2'	Buff to yellow & orange	Summer to frost	Flower best when nights are cool.
Cockscomb	Celosia argentea cristata	Full sun to partial shade	1'- 4'	Mostly yellow & red	Summer to frost	Crested type flowers
Cockscomb	Celosia argentea plumosa	Full sun to partial shade	1'- 4'	Yellows & reds	Summer to frost	Plume type or feather type flower. Sometimes called prince's feather
Spider Flower	Cleome spinosa	Full sun	3'- 4'	Pink, white, yellow	Mid summer to frost	Plant other flowers in front as these lose lower leaves.

(Annual Flowers, Con'd.)

Common Name	Botanical Name	Light Requirements	Height	Color	Blooming Period	Comments
Coleus	*Coleus blumei*	Sun to partial shade	6"- 2'	Multi-colored foliage		Also a colorful house plant.
Lantana	*Lantana camara*	Full sun to partial shade	2'- 3'	Yellow, orange, red, pink	Midsummer to frost	
Sweet Alyssum	*Lobularia maritima*	Full sun to partial shade	up to 5"	White, pink, lavender	Late spring to frost	Excellent for edging.
Geranium	*Pelargonium* (several species)	Full sun to partial shade	1'- 2'	White, pinks, reds, purples	Continuously	Also used as a house plant. Carefree strain is newer development.
Petunia	*Petunia hybrida*	Full sun to partial shade	6"- 1'	Practically all shades	Early summer to frost	Many types: multifloras, grandifloras, frilled, ruffled, single and double.
Scarlet sage	*Salvia* (several species)	Full sun to partial shade	6"- 2'	Wide range, mostly reds & blues		St. John's Fire is a compact variety.

(Annual Flowers, Con'd.)

Common Name	Botanical Name	Light Requirements	Height	Color	Blooming Period	Comments
Marigold	*Tagetes* (several species)	Full sun to partial shade	6"- 4'	Oranges, yellows, reds	Late spring to frost	A wide range of varieties available.
Verbena	*Verbena hortensis*	Full sun	8"-10"	Wide range	Summer to frost	They are spreading plants.
Periwinkle	*Vinca rosea*	Full sun	15"-18"	White, pink, rosy-purple	Summer to frost	
Pansy	*Viola* (several species)	Full sun	6"- 8"	Wide range	Spring	They need to be replaced with other flowers when hot weather arrives.
Zinnia	*Zinnia elegans*	Full sun	6"- 3"	Almost all, except blue		Many varieties available.

[redacted] [redacted]

C. Perennial and Biennial Flowers for Kentucky Gardens

Common Name	Genus Name	Season of Bloom	Colors	Height	Growth Conditions	Comments
Bugleweed	Ajuga	Spring	Blue, white, rose	6"-10"	Sun or partial shade	
Hollyhock	Althea	Midsummer to fall	Variety	3'- 8'	Full sun, rich soil	Newer varieties such as summer carnival and powder puff can be grown as an annual. Many blooms are double.
Columbine	Aquilegia	Mid to late spring	Pastels	1'- 4'	Moist, well-drained soil. Partial shade to full sun.	
Mountain Sage or Wormwood	Artemisia			up to 3'	Sun to partial shade	Valued for gray, finely dissected foliage. Excellent for fresh and dried arrangements.
Butterfly Weed	Asclepias	Midsummer to autumn	Vivid orange	1'- 2'	Well-drained sandy soil	Flowers are excellent for cutting. Seed pods are attractive in dried bouquets.
Chrysanthemum	Chrysanthemum	Fall	Variety	9"- 3'	Sun to partial shade. Rich soil.	Wide array of daisy-like flowers in various colors, shapes,

(Perennial and Biennial Flowers, Con'd.)

Common Name	Genus Name	Season of Bloom	Colors	Height	Growth Conditions	Comments
						sizes and types. Flowers are single, double, pompom, button, spoon and cushion types.
Delphinium or Larkspur	Delphinium	Summer	Mostly blue, also cream, lavender, pink, purple	2'- 7'	Fertile, well-drained soil. Full sun	Can be grown as annual if sown in early spring.
Sweet William, Pinks, Carnations	Dianthus	Spring	Mostly pink or rose, also red, white, yellow	6"- 2'	Full sun	
Bleeding Heart	Dicentra	Spring	Whites, pinks, reds	2'- 4'	Fertile soil, full sun to light shade	
Foxglove	Digitalis	Early summer	Variety	2'- 6'	Full sun to partial shade, Moist well-drained soil.	Variety Foxy can be grown as an annual.

(Perennial and Biennial Flowers, Con'd.)

Common Name	Genus Name	Season of Bloom	Colors	Height	Growth Conditions	Comments
Daylily	Hemerocallis	Summer	Variety	15"- 3'	Full sun, well-drained soil, high in organic matter.	
Rose Mallow	Hibiscus	Summer	Red, white, pink	to 5'	Full sun, prefer moist ground high in organic matter.	Because of height, place in the back of garden or in a group alone.
Iris	Iris	Spring to summer	Variety	10"- 3'	Full sun. Do best in fertile soil but will grow well in many types of soil.	There are over 200 species of iris. Two main groups are bearded and beardless. Need dividing every 3 years.
Peony	Paeonia	Spring	Variety	2'- 4'	Well-drained deep soil high in organic matter. Full sun.	Beautiful flowers & attractive foliage.
Phlox	Phlox [redacted]	Tall-summer, Creeping-spring	Variety	2½-3'-tall; 6"-creeping	Sunny, well-drained [redacted]	Two types are tall types, summer-flowering and creeping type, spring-flowering.

D. There are a large number of attractive garden plants that grow from specialized underground structures.

1. These may be either modified stems or roots.
2. Many people lump all these plants together and call them bulbs, but technically not all these structures are bulbs; in addition to bulbs there are corms, tubers, andrhizomes.
3. All of these have many cultural characteristics in common, as well as serving as storage organs for plants.
4. Winter-hardy bulbous plants include:
   a. Glory-of-the-snow, Chionodoxa - has little bulbs, blooms in early spring, small blue and white flowers. Will grow almost anywhere.
   b. Lily of the Valley, Convallaria - This plant has dark green foliage with dainty flowers in pink or white in the spring. They prefer partial shade and will grow well in a wide variety of soils.
   c. Crocus can be divided into two types, spring flowering and autumn flowering.
      1) The most popular ones are the spring-flowering types which bloom the same time as glory-of-the-snow; their flowers are very colorful over a wide range of colors.
      2) Autumn flowered crocus bloom late in the growing season.
      3) Crocus grow best in full sun or under deciduous plants.
   d. Snow drop, Galanthus
      1) This is also one of the earliest bulbs to bloom.
      2) A small plant.
   e. Hyacinth, Hyacinthus
      1) This is a very popular spring-flowering bulb.
      2) It consists of a spike of closely placed flowers.
   f. Lily, Lilium
      1) This is a very large genus of plants with species blooming from late spring to frost.
      2) The majority bloom in mid-summer.

        3) Most are rather tall and do best in partial shade to full sun in a deep soil high in organic matter.
    g. Grape hyacinth, *Muscari* - This small bulb produces upright clusters of grape-like flowers in early spring.
    h. Daffodil, Jonquil, *Narcissus*
        1) There are eleven groups of *Narcissus* according to flower types.
        2) They grow best in full sun but will do very well under deciduous trees.
        3) They vary in size from a few inches high to one foot high.
        4) Blooming is mainly in the spring but there are varieties that bloom early as well as late.
    i. *Tulip*
        1) There are also many forms of tulips.
        2) Practically every color of the rainbow is available in tulips and there are varieties that bloom from early spring through late spring.
5. Tender bulbs include:
    a. Tuberous Begonia, *Begonia* - There is a wide range of tuberous begonias. The flowers range from single to double with other variations in the bloom type. If the tubers are started indoors in February or March, the plants will bloom sooner.
    b. *Caladium* - These plants have brightly colored, heart-shaped leaves. They are a tropical plant requiring warm temperatures and shade for best growth.
    c. *Canna* - These plants will begin flowering in midsummer when everything else looks tired. They are easy to grow if in good soil exposed to full sunlight. They are a rather tall growing plant with some varieties growing to five or six feet.
    d. *Dahlia* - Most dahlias are grown from tuberous roots; however, they can also be grown from seeds. They should be planted in a sunny well-drained location.

It is a good idea to stake the tall-growing varieties at planting time so as not to injure the roots by staking later.

e. Gladiolus - This easy-to-grow plant is available in almost every imaginable color. It lasts well, which makes it popular for cut flowers. They grow best in full sun in a well-drained location.

IV. Culture

A. Annuals (most of the plants that are grown for their flowers) need a fertile, well-drained soil rich in organic matter and plant food nutrients.
  1. Organic matter should be added to the soil once each year.
  2. In the spring, add one to two pounds per 100 square feet of a complete fertilizer such as 10-10-10. Do not work the soil in the spring until it is dry enough that it falls apart easily and is not compacted.
  3. Annuals are started from seeds each year.
    a. Earlier blooms will result if the seeds are started indoors and transplanted outside when the weather is settled.
    b. The started plants can be purchased at garden centers and other related businesses.
    c. The plants should be transplanted on a cloudy day when the wind is still or in the evening when the rays of the sun are less intense.
    d. Plants that have been started indoors should be hardened off by being placed outside in a semi-protected area a few days before planting.
  4. Flowers need room to grow if they are to reach their full potential. The spacing varies according to the kind of plant.
  5. Tall-growing plants, when they have reached about one-third their growth, need support against heavy winds and rain.
    a. A branch of twiggy brush can be stuck into the soil by a sprawling plant; as the plant grows it will conceal the supporting twig.

   b. A stake can be stuck into the ground by tall stems, which should be tied loosely to it.
   c. As an alternate to these two methods for a bed full of slender-stemmed plants, string can be crisscrossed between two rows of stakes.

6. Weeds are unsightly, they steal moisture and nutrients and they shade the flowering plants.
   a. They should be removed gently so as not to disturb the flower roots.
   b. A hoe is not recommended, since it might damage the shallow roots.
7. Many plants have a tendency to grow straight up with one stem.
   a. By pinching out the tips the plant will branch out below this point, making it bushy with more flowers.
   b. Also the spent blossoms should be removed before seeds start to form, thus encouraging additional flowers.
   c. Actual pruning (where a portion of the plant is removed) is beneficial to some plants.
   d. The petunia, in many instances, spreads out over a considerable area, producing fewer blossoms in late summer. If the sprawling stems are cut back, the plant is more compact and bushy and usually contains more blossoms.
8. Annuals need to be watered regularly.
   a. A thorough soaking at infrequent intervals is far superior to a light sprinkling daily, which only serves to dampen the soil surface.
   b. Water early enough in the day so the foliage has time to dry before night. Watering in the late evening invites fungus diseases.
   c. Annuals generally bloom much better in a cooler, more moist soil. This condition is more easily provided with a good mulch.
9. After a killing frost, remove the dead plants and add them to the compost pile. If infected with diseases and insects, burn them.

B. Perennial gardens last for a long period of time.
  1. The soil must be prepared to last for perhaps ten years or longer. In fact, the peony can grow in the same location for 20 or 30 years without needing dividing.
  2. Since perennials are permanent plantings, the soil should be prepared to a great depth.
  3. Double-digging is helpful in preparing for top-notch results with perennials.
    a. In double digging, make a trench two feet wide and as deep as the spade, six to eight inches.
    b. Place this soil to the side. Spread two to four inches of organic matter in the trench on the subsoil along with some limestone and fertilizer; work these materials into the subsoil to a depth of six to eight inches.
    c. A second trench is then dug the same size as and adjacent to the first trench.
    d. The topsoil from the second trench is shoveled into the first.
    e. The subsoil is treated the same as in the first trench.
    f. This process of topsoil transfer and subsoil digging is repeated until the entire area has been dug.
    g. The topsoil from the first trench is then placed upon the subsoil of the last trench.
  4. In order to be certain as to the correct amount of lime and fertilizer to apply a soil test should be made. Perennials can usually get by on less nitrogen but require large quantities of phosphorus and potassium.
  5. In cases where the decision is made against double digging, the bed may be worked with a rotary tiller.
    a. Before tilling the soil remove the sod, including all weeds and weed roots.
    b. Make an initial trip over the bed with the tiller.
    c. Spread organic matter, fertilizer, lime, etc. over the surface and till again, preferably to a 12-inch depth.
  6. Perennials usually can be planted in the fall or spring, the deciding factor being the growth habit of the plant.

   a. If the plants are purchased growing in containers, either time may be satisfactory.
   b. If purchased bare-root, they should be transplanted in the spring, with the exception of plants like bearded iris, daylilies, peonies, etc. which are transplanted in the fall.

7. In transplanting perennials, be sure to spread the roots in a natural position; do not crowd them all into one little hole. Also the plant must be set at the depth at which it previously grew, and the soil should be well firmed around the plant to eliminate air pockets.
8. Spacing will vary according to the size of the plant--a good general rule may be a spacing of 6 to 12 inches for short or dwarf plants, 18 to 36 inches for tall plants, and 12 to 18 inches for the intermediate plants.
9. When the perennials are established, the bed should still receive a shallow cultivation each spring.
   a. A one to two inch depth between individual plants or groups of plants will be adequate.
   b. A topdressing of fertilizer at this time will produce remarkable results.
10. Here, as with practically all garden plants, a good mulch is needed.
11. The plants will also need staking, the same as annuals. Without this practice, summer thunderstorms will play havoc with the garden.
12. In order to perform admirably, the plants must receive adequate water. Many of these plants are deep-rooted and require a thorough soaking.
13. The number of blooms on many plants can be increased considerably by pinching back the growing stems, thus forcing them to send out three or four stems where there was only one before.
   a. This practice is especially recommended for late-blooming plants such as asters and chrysanthemums.

   b. In addition to increasing the number of blooms it also reduces the height, which cuts down on staking requirements.

14. If large, specimen-type blooms are desired, the practice of disbudding may be carried out.
    a. In disbudding all lateral buds are removed leaving only the end bud.
    b. With disbudding all the strength of each stem can go into producing a single magnificent flower.
15. Many perennials, such as phlox and delphinium, normally produce one crop of blooms each season.
    a. If the first crop of blooms is removed as soon as the flowers fade, the plants will not use energy to produce seeds and will often produce a second crop of flowers.
    b. Even if a plant does not produce a second crop, faded flowers should still be removed, because producing seeds weakens the plant and cuts down on the next year's production.
    c. Also, when seeds are produced and allowed to fall to the ground the plants that come from these seeds many times bear little or no resemblance to the parent plant. Phlox is a common example of this.
16. When the leaves have withered in the fall, cut all old stalks to the ground.
    a. If they are likely to be subjected to alternate freezing and thawing, they should be protected with a winter mulch, such as straw, oak leaves, or Christmas tree boughs.
    b. Wait until the ground is frozen to place the mulch, for it is not the freezing which damages the plants but the alternate freezing and thawing.
    c. In the spring, remove the mulch in two stages a few days apart to help the new growth to become gradually adjusted to the new conditions.

C. Bulbous plants require a soil that is well-drained and deeply dug. Bulbs will rot quickly if placed in areas where there is standing water.

1. The winter-hardy, spring-flowering bulbs flower best in full sunlight.
    a. They may tolerate light shade but will soon disappear in heavy shade.
    b. They grow well under deciduous trees that leaf out in the spring, since shade later in the season is not too important.
2. The tender, summer-flowering bulbs require full sunlight.
3. Bulbs will benefit from a very early spring application of a low nitrogen fertilizer such as 5-10-10.
    a. One to two pounds per 100 square feet should be adequate.
    b. A second fertilizer application may be made in the very early fall.
4. A good mulch will conserve moisture and control weeds, thus cutting down competition which will cause the bulbs to decline quickly.
5. Since the foliage produces the food that is stored in the bulb for next year's flowers, do not remove the foliage until it is dead.
    a. This is why bulbs should not be planted in a lawn area to be mowed.
    b. Usually the foliage of the hardy, spring-flowering bulbs will be matured by mid-June.
6. Cut faded flowers after blooming to prevent seed formation, as this takes away from food stored for next year's flowers.
7. The depth to which the bulbs should be planted varies with the species and size of the bulb. Some general guide rules are:
    a. Bulbs less than two inches in diameter should be planted three to four times as deep as their diameter.
    b. Those with a diameter over two inches should be planted two to three times as deep as their diameter.
    c. In sandy soils, place the bulbs slightly deeper, while in clay soils do not plant as deeply as recommended.
    d. Hardy bulbs will usually last longer in deeper plantings.
8. The spacing between bulbs varies, as does the depth.

a. The closer the spacing the more frequently dividing will be required.

b. Closer spacing will make a more attractive massed display.

c. Normally, allow the same space between bulbs as was allowed for depth.

9. The hardy spring-flowering bulbs should be planted in the early fall. They can be planted quite late, but the blooms may occur later and be of lower quality.

10. Summer-flowering bulbs such as dahlias, cannas and gladioli are planted in the spring. They are taken up again in the fall and stored in a cool (not freezing) place over winter.

V. Insect and Disease Control

A. Gardeners can defend against insect and disease attack by regular spraying with a fungicide-insecticide mixture.

1. Maneb, Zineb, Captan or Folpet are excellent fungicides.
2. Sevin and Malathion are effective insecticides.
3. Some of the insects controlled by sevin or malathion include: aphids, leafhoppers, beetles, mites, leaf miners, and thrips.
4. Diseases controlled by the fungicides include: leaf spot, botrytis blight, powdery mildew, damping off, and rust.

B. Slugs and snails are usually concealed during the day but emerge at night to feed on plants.

1. They chew large holes in the leaves and may completely devour young shoots.
2. As they travel they leave a telltale slimy trail behind them.
3. Use metaldehyde bait in spray, dust or pellet form as control.
4. They can also be lured to a drowning death by placing shallow bowls of beer or grape juice near plants.

C. When spraying or dusting plants remember that the key to successful control is complete coverage. This means the underside of the leaves as well as the top, stems and branches.

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:

1. No home ground is complete without a few well-chosen annual and perennial flowers.
2. A versatile gardener will use all types of plants (annuals, biennials, perennials, bulbs, shrubs and trees) in an attempt to provide colorful flowers from spring to fall.
3. Many herbaceous perennials are hardy, rugged plants that will thrive with minimum care and still will bloom for a longer period of time than many shrubs and trees.

B. Things to be brought out by the class members:

1. Experiences in raising annuals, biennials, perennials and bulbous plants.
2. Responses to the question "Why do you like to grow annuals? biennials? perennials? bulbous plants?"

II. Conclusions

A. Reasons for growing flowers are:

1. They are a source of cut flowers
2. Flowers add color to the garden
3. Most flowers are easy to grow
4. Flowers give joy to the homeowner
5. They are good temporary plantings
6. Flowers provide excellent fill-in where permanent plantings have not yet matured.
7. Many flowers come up year after year
8. Many multiply freely
9. Choices are numerous and diverse.

B. Even though the main purpose of the flower garden is to provide color all during the growing season, a person cannot escape the year-round effect of the flower bed in selecting the proper location.

C. The public area is not the proper location for the flower garden. Instead, it should be to the side or rear of the house where it is visible from the family area within the house and from the private area outside.

D. Some cultural practices necessary are:
   1. Proper soil preparation and fertilization.
   2. Adding organic matter
   3. Using a mulch
   4. Proper seeding and transplanting
   5. Pinching to promote branching
   6. Removing faded blooms to prevent seed production and encourage additional flowers
   7. Disease and insect control
   8. Watering as needed.

III. Enrichment Activities

A. Visit local gardens specializing in annuals, biennials, perennials and bulbous plants.

B. Visit flower-trial gardens at the University of Kentucky.

IV. Suggested Teaching Materials

A. References
   1. Annuals, Time-Life Encyclopedia of Gardening.
   2. Annuals for Your Flower Garden, Correspondence Course No. 143, The Pennsylvania State University.
   3. Approved Practices in Beautifying The Home Grounds by Norman K. Hoover, pp. 245-275.
   4. Better Homes and Gardens New Garden Book, pp. 182-258.
   5. Bulbs For Summer Bloom by John Philip Baumgardt.
   6. Bulbs for Your Flower Garden, Correspondence Course No. 142, The Pennsylvania State University.
   7. Color For Your Yard and Garden by Elda Haring.
   8. Gardening and Home Landscaping by Jack Kramer, pp. 133-169.
   9. Home Floriculture, Correspondence Course No. 86, The Pennsylvania State University, Lessons 4, 5, and 7.
   10. Landscaping and the Small Garden by Marjorie J. Dietz, pp. 107-124.
   11. Landscaping Your Home by Wm. R. Nelson Jr., pp. 73-78.
   12. Maintaining The Home Landscape, H. S. Unit 83, pp. 5-8.

[redacted]

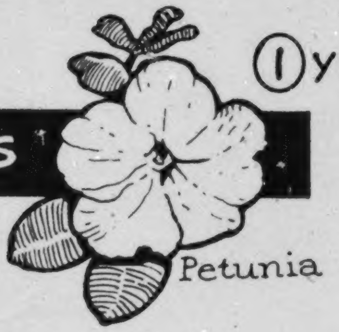
13. Minimum Maintenance Gardening Handbook by Walter F. Bruning, pp. 130-145.
14. Perennials, Time-Life Encyclopedia of Gardening.
15. Perennials and Biennials for Your Flower Garden, Correspondence Course 147, The Pennsylvania State University.
16. Planning the Home Landscape, H. S. Unit 81, pp. 12-13.
17. Reader's Digest Practical Guide To Home Landscaping, pp. 266-281.
18. Starting the Home Landscape, H. S. Unit 82, pp. 14-17.
19. The Complete Gardener by Lois Wilson, pp. 240-284.
20. The Complete Illustrated Book of Garden Magic by Roy E. Biles, pp. 123-175.
21. The Picture Book of Perennials by Arno and Irene Nehrling.

B. Resource Personnel
   1. Cooperative Extension specialists
   2. Consult local sources
   3. For specific personnel see Vo-Ag Directory of Resource People in Kentucky.
   4. Representatives of seed supply companies.

C. Audio-Visuals
   1. Masters
      - -1 Three Types of Flower Plants
      - -2 Flower Bed Location
      - -3 Soil Preparation for Flowers
      - -4 Planting Depth for Spring Flowering Bulbs
      - -5 Care of Flowering Plants
   2. Slides, Flowers for Garden Color, Set of 29 slides prepared by Malcolm R. Harrison, Extension Specialist in Horticulture and Donald B. Lacey, Associate Extension Specialist in Home Grounds, Rutgers, The State University of New Jersey. Available from: Ohio Agricultural Education Curriculum Materials Service, Room 201; 2120 Tyffe Road, Columbus, Ohio 43210.

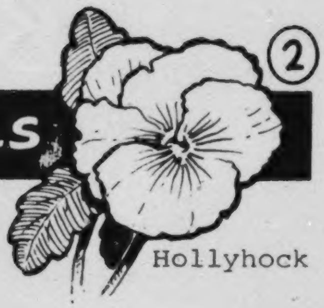
3 Types of FLOWER PLANTS

ANNUALS


Petunia

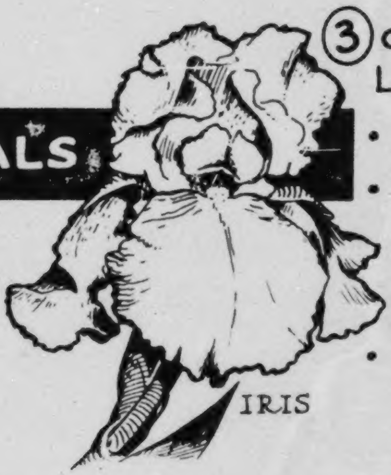
① YEAR LIFE CYCLE
- Grow
- Flower
- Die

BIENNIALS


Hollyhock

② YEAR LIFE CYCLE
- Grow First Yr.
- Flower and Produce Seed Second Year.

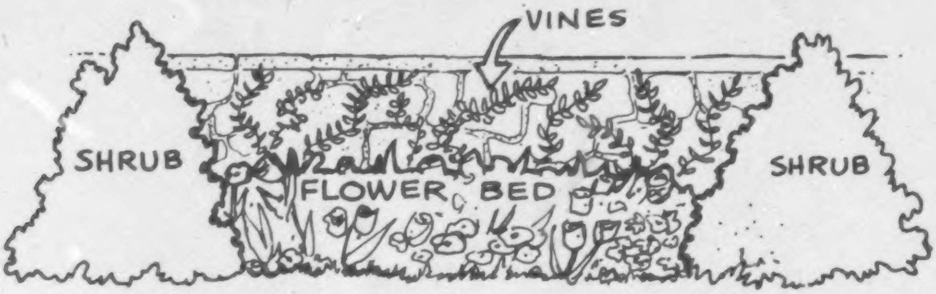
PERENNIALS


IRIS

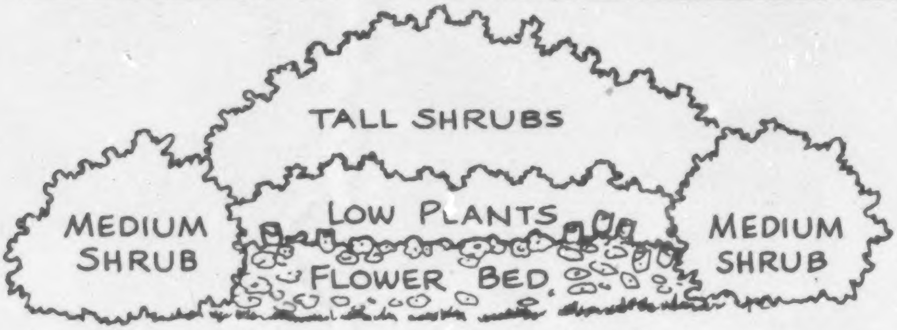
③ or MORE YEAR LIFE CYCLE
- Grow First Yr.
- May Flower Second Year and Thereafter With Care
- Top Dies Back-Roots Live On During Cold Weather

T. Vantreese, INST MATL. LAB., U.K.

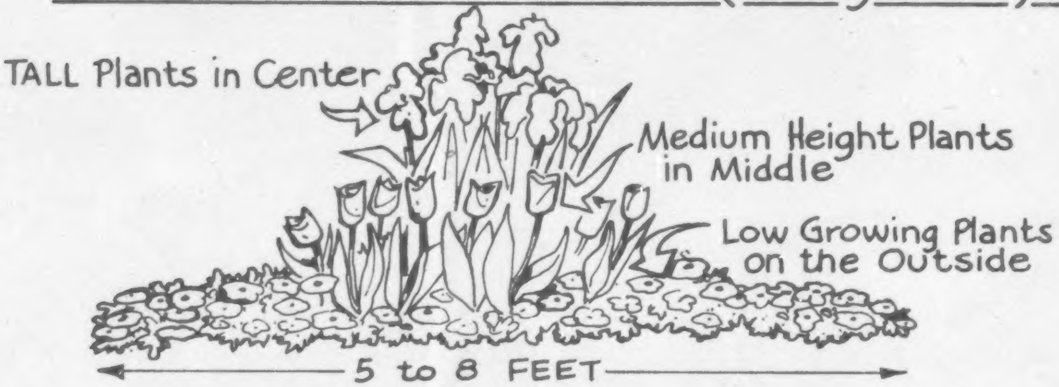
FLOWER BED LOCATION


VINES
SHRUB
FLOWER BED
SHRUB

A BORDER PLANTING (Background)


TALL SHRUBS
MEDIUM SHRUB
LOW PLANTS
FLOWER BED
MEDIUM SHRUB

A CORNER PLANTING (Background)

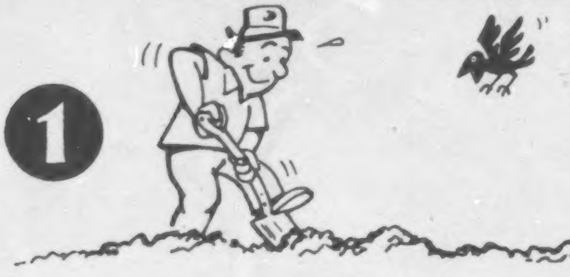

TALL Plants in Center
Medium Height Plants in Middle
Low Growing Plants on the Outside
5 to 8 FEET

OPEN FLOWER BED PLANTING

Adult 110-8-2

T. VANTREESE, INST. MATL. LAB., U.K.

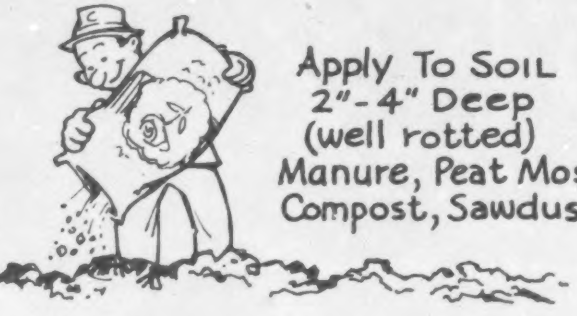
SOIL PREPARATION for FLOWERS



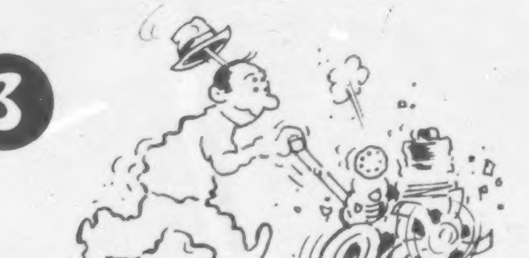
1 WORK SOIL THOROUGHLY

(Spade, Plow, Etc.)

2 APPLY ORGANIC MATERIAL



Apply To Soil
2"-4" Deep
(well rotted)
Manure, Peat Moss,
Compost, Sawdust

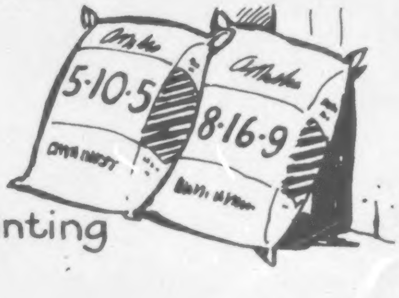


3 MIX SOIL WELL

Mix it 7"-10" Deep

4 USE A COMPLETE FERTILIZER

Apply 2# per 50 Feet Planting



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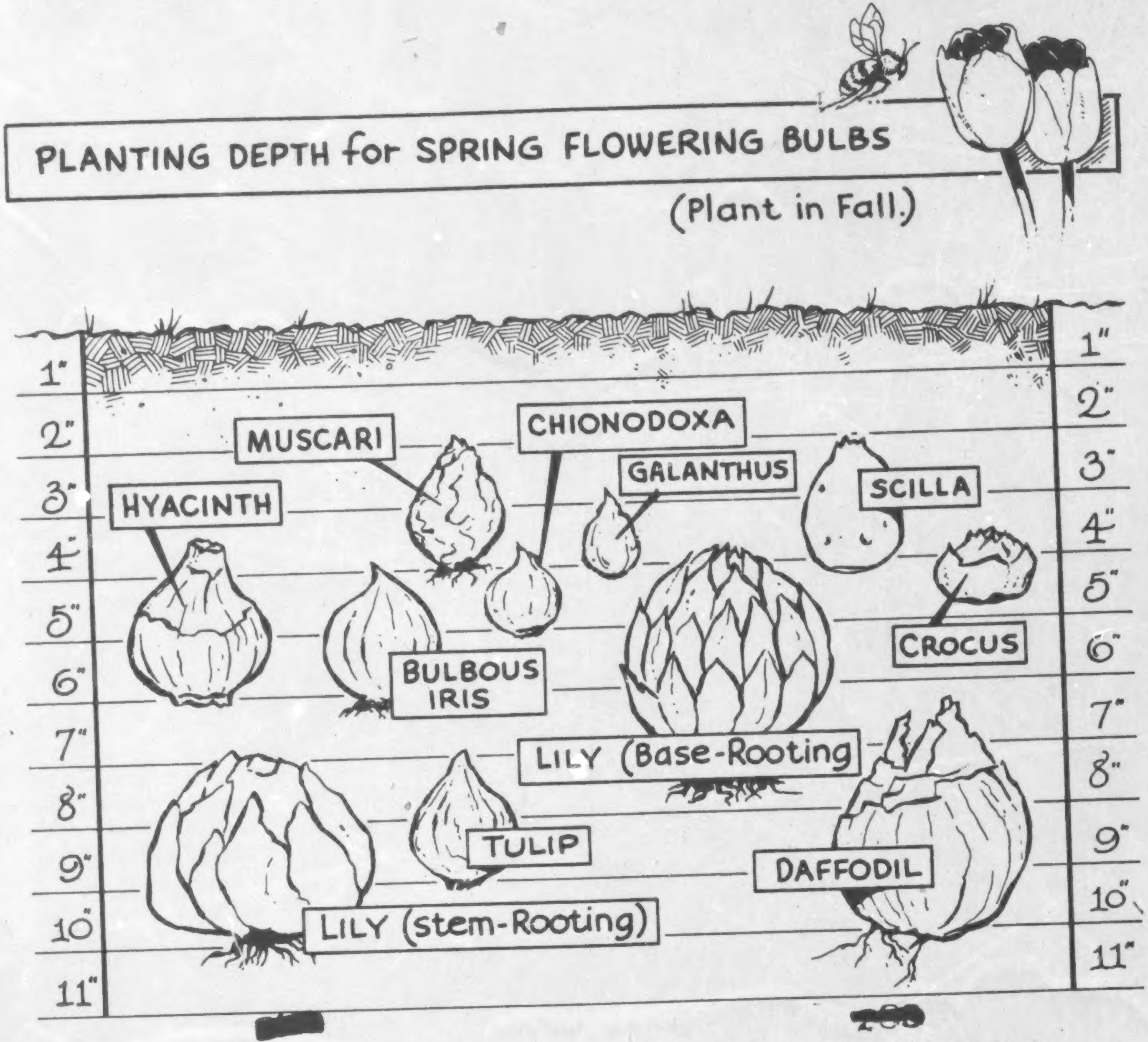
PLANTING DEPTH for SPRING FLOWERING BULBS

(Plant in Fall.)

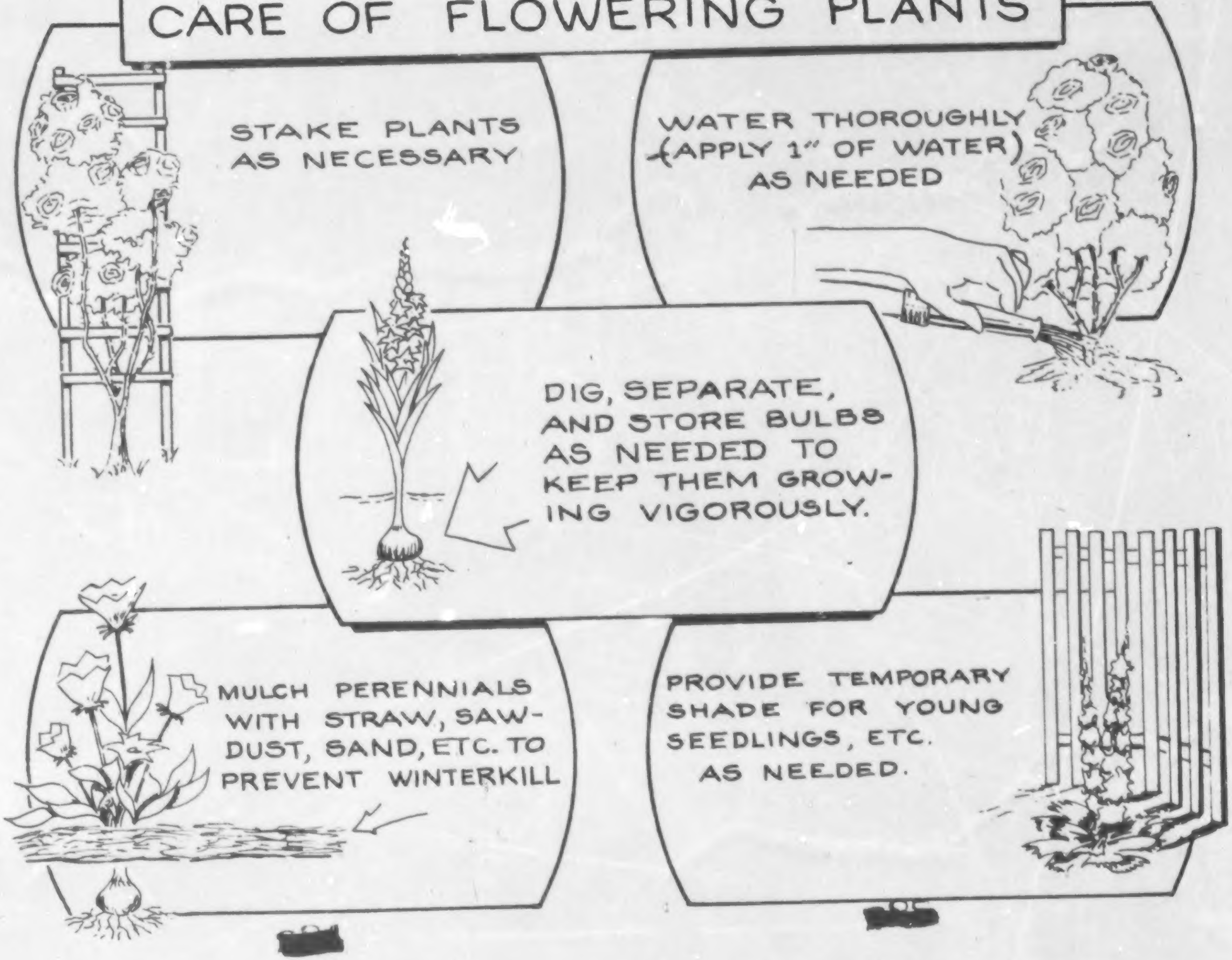

1"
2"
3"
4"
5"
6"
7"
8"
9"
10"
11"
MUSCARI
CHIONODOXA
GALANTHUS
SCILLA
HYACINTH
CROCUS
BULBOUS IRIS
LILY (Base-Rooting
TULIP
DAFFODIL
LILY (stem-Rooting)

[redacted]

[redacted]

NOTE: In dense clay soils, more shallow planting is recommended.
Adult 110-8-4

CARE OF FLOWERING PLANTS



STAKE PLANTS AS NECESSARY

WATER THOROUGHLY (APPLY 1" OF WATER) AS NEEDED

DIG, SEPARATE, AND STORE BULBS AS NEEDED TO KEEP THEM GROWING VIGOROUSLY.

MULCH PERENNIALS WITH STRAW, SAWDUST, SAND, ETC. TO PREVENT WINTERKILL

PROVIDE TEMPORARY SHADE FOR YOUNG SEEDLINGS, ETC. AS NEEDED.

R.GILMORE, INST. MATL. LAB, UK

Lesson 9

SPECIALTY GARDENS

Objective -- To develop the effective ability of homeowners to properly establish and maintain specialty gardens.

Problem and Analysis -- How should we establish and maintain specialty gardens?

-Rose gardens
-House plants for the home
-Natural gardens

Content

I. Rose Gardens

   A. Characteristics of roses
      1. The rose is one plant which almost every gardener gets around to growing, sooner or later.
      2. It is probably the oldest cultivated flower.
      3. This plant has thorns which prick and scratch, but there is unequaled strength.
      4. The plants have little or no value as far as design goes, but they outperform most other plants in the garden in the number of flowers produced, the length of the blooming season, and normal life expectancy.
      5. The leaves of this plant are not as handsome as the healthy, glossy foliage of other plants, but to a large number of people the flowers are the most beautiful in the world and the fragrance the sweetest.
      6. The blooms have inspired men to poetry, song, romance and bewitched admiration.
      7. Architects, painters, and sculptors have used its form to embellish cathedrals, buildings, and tombs.
      8. The flowers occur in a wonderful variety of

sizes, shapes, colors and fragrances.

B. To some people roses may appear to be too much trouble to grow.
  1. Roses do require a certain amount of care, as does any plant.
  2. Roses are not difficult to grow; by using common sense and carrying out sound horticultural practices, anyone can grow them.
  3. Fossil records verify the fact that roses were growing before there were human hands to tend them.
  4. Wild roses grow in every state.

C. Roses can be divided into types or classes based on their habit of growth or flower qualities.
  1. Most roses grown today are continuously flowering kinds blooming from May to October.
  2. The most popular rose grown today is the hybrid tea. Other types of roses grown include floribundas, grandifloras, climbing roses, shrub roses, tree roses, and miniatures.
    a. The hybrid tea roses are the aristocrats of the rose family.
      1) They are a group of everblooming roses, blooming from May through October.
      2) They are available in a wide range of color, fragrance, flower shape and size well adapted to garden display or use as cut flowers.
      3) They grow in bush form, three to five feet tall, and are large flowered.
      4) They are hardy but perform best if given winter protection in Kentucky.
    b. Floribundas are a result of crossing hybrid tea roses with polyanthas (a group of hardy, remontance roses, blooming more than once during a season).
      1) They flower in clusters on compact, twiggy shrubs, usually not as tall as hybrid teas.
      2) Most floribundas have moderate-sized flowers, smaller than hybrid tea roses, with the exception of some of the newer varieties.

    3) They are hardier than hybrid teas and more constant-flowering.
    4) They are most effective when planted in a group to give a mass effect.
- c. Grandiflora roses are the result of a cross between hybrid teas and floribundas. Generally they are taller than hybrid teas and more hardy, with a large number of smaller flowers.
- d. Climbing roses do not have tendrils or "holdfasts" as do the true vines; they have long, arching, upright canes which can be trained to trellises or other supports.
    1) There are several kinds of climbing roses. There are the large-flowered climbers which bloom recurrently--these can usually be grown without winter protection in Kentucky.
    2) The rambler roses are hardy climbers that grow vigorously but are seldom grown today because of the short season of bloom.
    3) There are also climbing forms of some of the bush varieties, such as hybrid teas. These are the least hardy of the climbing roses but can be grown in protected areas.
    4) There is a group of semi-climbers called pillar roses which grow six to eight feet tall, are usually grown tied to a post, fence, etc., and have medium to large flowers occurring several times during the season.
- e. Shrub roses are a group of roses that do not fit well into any of the other groups.
    1) They have a bush or shrublike habit of growth and are quite hardy and vigorous.
    2) Most of the roses in this group are referred to as "old roses."
    3) They were popular 50 to 100 years ago.
    4) Many of these roses have a powerful fragrance.
- f. Tree roses are a result of grafting bush rose varieties on strong stems. Since they are not extremely hardy they require winter protection.

   g. Miniature roses are small replicas of the hybrid teas; they grow from six inches to one foot in height with flowers that are 3/4 to 1 1/2 inches across. Being very winter hardy, they last for years and bear many flowers.

D. Roses do best in a moderately heavy soil that is well-drained and deep with a generous supply of organic matter.

E. Roses can be grown with shrubs, or in the perennial flower bed, but their culture is easiest in a well-prepared bed by themselves. They are extremely susceptible to competition from the roots of other plants.

F. Other conditions required for roses is full sunshine, or at least a minimum of five to six hours full sunshine. They should be planted in the open to allow for good air circulation but they should not be fully exposed to strong winter winds.

G. In order to have a garden filled with beautiful roses and vigorous, healthy bushes, the first requirement is to buy the best plants available.
   1. The gardener who looks for a bargain is likely to end up with weak, undersized plants which may require nursing and coaxing all summer long.
   2. To be assured that good plants are purchased, deal with a reputable seller and look for the quality-grade markings established by the American Association of Nurserymen.
   3. The best plants are rated number 1, while the lesser ones will be rated number 1½ or number 2.

H. In deciding on the particular rose variety to purchase, a person has two guides to follow:
   1. AARS (All-American Rose Selection) is an association of rose growers and nurserymen which test new varieties and endorse only a few.
      a. Each year the All-America selections are announced.
      b. If undecided as to which variety to purchase, select an All-American variety.

c. A few of the All-American varieties are: Portrait, First Prize, Tropicana, Peace, Apricot Nectar, Apollo, and Matterhorn.

2. The American Rose Society grades roses on a numerical scale.
   a. A rating of 10 would be perfect.
   b. Any rose with a rating of 8.0 or higher is considered a good choice. These ratings are available at a small cost from the Society, 4048 Roselea Drive, Columbus, Ohio 43214.

I. Commercial roses are budded onto a vigorous rootstock and are rarely grown on their own roots. This point on the stem forms a knuckle-like knot of wood and is referred to as the bud union.

J. Roses are shipped bare-root from the nursery.
   1. They should be examined upon receipt.
   2. If satisfactory, they should be set out immediately.
   3. If they cannot be set out immediately they may be kept in a cool, dark place until ready to plant.
   4. If they cannot be planted in a day or so, they should be protected by "heeling in" (burying in a shallow ditch that is planted on the bottom).
   5. A healthy bush will have several plump, fresh greenish canes as well as several plump roots well distributed around the plants. The roots should be long and unbroken.

K. The recommended time for planting roses is in the late fall or early spring.
   1. Where winters are severe, spring planting is much preferred.
   2. The spacing for roses such as the hybrid teas is three feet.
   3. The larger roses such as the climbers should be spaced six feet apart.
   4. Dig the hole 18 inches wide and 18 inches deep.
      a. The topsoil that was removed should be mixed with peat moss and a small amount of fertilizer.

- b. Replace enough of the soil mixture to make a cone shaped mound in the bottom of the hole.
- c. Lay the plant roots over this cone so that the bud union is level with the ground.
- d. To gauge the location of the bud union, lay a stick across the top of the hole.
- e. Add more soil so the roots are covered with four to six inches of soil.
- f. Firm the soil.
- g. Fill the hole with water.
- h. When the water has drained through, fill the hole to the top with additional soil.
- i. In order to protect the plant from the sun and drying winds, mound 8 inches of soil around the bud union.
- j. Leave the mound in place until new growth is ¼ inch in length, then remove gradually.

L. Rose beds must receive a thorough watering regularly throughout the growing season.
  1. In most areas this means once a week.
  2. Water the beds in the morning so the canes and leaves will dry before afternoon and evening hours.

M. Since roses bloom all during the growing season, their diet cannot be neglected.
  1. The first feeding in the spring should be done as soon as the pruning is completed and before the summer mulch is added.
  2. The second feeding should be done when the new growth is two inches long.
  3. Thereafter, the plants should be fed every four to six weeks until mid-August.
  4. A small amount of 10-10-10 or one of the many rose fertilizers available should be used.
  5. In late August, scatter one handful 0-20-20 around each plant to help condition the plants for winter.

N. A two-to four-inch thick mulch on top of the soil in the rose bed is the most effective way to conserve moisture.

   1. Indeed, it does far more than save moisture; it keeps the soil as much as 10 to 20 degrees cooler than unmulched soil, giving the cool soil temperature in which the roots grow best.
   2. A good mulch discourages weed competition.
   3. It improves the appearance of the garden, giving it a finished look.
   4. When decomposed, it can be worked into the soil or left as a starter for the next year's mulch.
   5. Any type of organic matter can be used as a mulch.
   6. It is best applied in the spring.

O. Pruning of roses is necessary in order to encourage healthy, vigorous growth with a maximum of high-quality flowers.
   1. Severe pruning forces long, succulent growth with fewer, though larger flowers.
   2. Hybrid teas, floribundas and grandifloras bloom on wood of the current season, and thus should be pruned in the early spring immediately before new growth begins (or as it is just beginning).
      a. First, remove all dead and injured wood and much of the very slender, twiggy growth.
      b. If the plant has a large number of stems, remove some from the center in order to open the center.
      c. Cut the remaining branches back to the desired height.
         1) If fewer but larger blooms are desired, cut back to 8 to 12 inches.
         2) If more blooms, though smaller are desired, cut back to 18 to 24 inches.
      d. Make these pruning cuts just above a bud pointing to the outside of the bush.
   3. The large-flowered climbers produce most of their blooms on wood that is less than four or five years old. Pruning consists of removing the oldest canes in the early spring to encourage new growth.
   4. The varieties that bloom only in the spring, such as the ramblers, should be pruned hard

after flowering. When a shoot has flowered once it will not flower again; therefore, it should be removed so the energy of the plant can go into the production and ripening of new shoots for next year's bloom.

5. Climbing hybrid teas should be pruned only lightly.
6. Pillar roses, as well as tree roses, should be pruned only to maintain good shape.
7. Shrub roses are so hardy that they seldom have winter-killed branches to remove. Remove any dead branches as well as a few of the oldest branches after bloom.
8. Many rose blossoms will be removed from the plant to use in floral arrangements in the home, as exhibits in a flower show or for some other purpose, but if allowed to stay on the plant the blossoms should still be removed when it fades before it has a chance to set seed.
    a. There is a right way and wrong way to cut blooms, since this determines the plant's growth pattern.
    b. In cutting blooms, make the cut ¼ inch above the first strong five-leaflet leaf below the fading bloom.
    c. There will also be some three-leaflet leaves and maybe single leaflets, but a five-leaflet leaf is the one most apt to cover a bud that is mature enough to develop into a strong flower-bearing stem.
    d. When the flowers occur as a cluster on one stem, remove each blossom in the cluster as it fades. When the last blossom in the cluster fades, cut the stem off above the first strong five-leaflet leaf below the bloom.
    e. In mid-September, stop cutting flowers of any kind.
        1) This permits seeds to develop and helps settle the plant into dormancy as winter approaches.
        2) Roses can be harmed by too much cutting.
        3) A long stem removes a considerable amount of foliage, which may slow the growth. Longer stems can be

more safely taken later in the season than in the spring.

P. Disbudding (removal of all flower buds on a stem except the end bud) can be practiced on roses, which will result in larger blooms. Obviously this reduces the total number of blooms, but this is sometimes necessary in order to secure exhibition-type blooms.

Q. In cutting blooms for flower arrangements, the best time to cut the blooms is in the late afternoon.
  1. The next best time is in the early morning.
  2. Never cut rose blooms in the heat of the day.
  3. Plunge the entire stem in hot tap water up to an inch or so below the bloom.
  4. Remove after one hour and plunge the stems in cold water. They can be kept overnight in this water in the refrigerator until morning. To help the stem absorb more water, smash the bottom inch with a hammer.

R. Suckers sometimes develop on the stem below the bud union.
  1. These are fast-growing shoots that will quickly dominate the plant, eventually destroying it.
  2. They have small, finely serrated leaves and must be removed.

S. Roses are attacked by pests and diseases; therefore, control of these enemies is an essential part of rose culture.
  1. The key to the solution is to give regular attention with sprays or dusts to keep them healthy.
  2. A person cannot afford to wait until the plant is covered with some insect or infected with some disease to start a spray program.
  3. Buy a rose spray or dust that contains an insecticide as well as a fungicide and use it religiously.
  4. Apply the material once a week in the spring, cutting the application to once every two weeks in hot, dry weather.

T. Serious damage can be done to roses by the winter weather.

1. Although the pruning of hybrid teas, floribundas and grandifloras is done in the spring, the long canes can be cut back to 30-36 inches in the fall. This helps to reduce the danger of breaking the cane during winter storms.
2. Clean the rose beds of debris (leaves, twigs, etc.) in late autumn. They may harbor diseases and insects which will cause trouble the next growing season.
3. Also, in late autumn, soil should be mounded around the plant to a depth of at least 8-10 inches.
   a. Don't take this soil from around the base of the plants but bring it in from elsewhere.
   b. If extremely low winter temperatures are expected, a coarse mulch of straw, evergreen boughs, or similar materials can be added to the soil mounds after the ground has frozen.
   c. The purpose of this winter protection is to prevent heaving as a result of the alternate freezing and thawing that occurs during periods of cold and mild winter weather.
4. Collars can be purchased or made from tarpaper and, when placed around the plant, filled with a mulch material. The usual recommendation is not to use leaves as a winter protection material for roses, since they mat down (causing rot) and may even harbor disease organisms that attack the plant.
5. There is also a foam-plastic cone that can be purchased to slip over the rose plant to provide winter protection. These cones are anchored by placing stones or soil on the bottom flange to keep them from being blown away.
6. The winter covering should be removed before the plants make new, soft growth. The soil can be removed a little at a time over a period of a couple of weeks.

II. House Plants For the Home

A. There is a burgeoning interest in house plants all over the country.

1. They add freshness and individuality to any room.
2. With a collection, a person has an ever-changing array of plant decorations.

B. The available light is one of the first considerations in growing healthy house plants.

1. Generally speaking, foliage house plants can get by on less light than flowering house plants. Even though some foliage plants can exist in a dark corner, a longer-lived, more handsome plant will result from filtered light being available.
2. Windows facing east, southeast and south are the preferred locations for a minimum of light. Northern windows are suitable mostly for those plants that can get by with a minimum of light. Examples include Chinese evergreen, aspidistra, and some of the ferns.
3. In the winter there is little chance of having indoor plants harmed by too much sun. In order to have symmetrical plants, the containers should be rotated one-quarter to one-half turn each time they are watered.

C. Artificial lighting may be used to lengthen the day, or to provide all the light for such plants as African violets and gloxinias.

1. Plants utilize two rays of light, the red and blue.
    a. Red light alone causes a plant to become tall and spindly.
    b. Blue light alone causes low stocky growth.
    c. A proper balance between the two is needed to produce a plant with normal growth and shape.
    d. Light from fluorescent lamps is high in both red and blue rays but it is extremely low in the range called far-red - the rays that encourage flowering, germination of light-sensitive seed, as well as other plant responses.
    e. Incandescent light contains approximately the same relative proportion of red rays and far-red as does sunlight.

2. The conclusion can be drawn that fluorescent and incandescent lights both are needed for flowering plants requiring large proportions of infra-red light rays; however, wide spectrum tubes have been developed for fluorescent fixtures which supply the infra-red rays in sufficient quantities to eliminate the need for incandescent light.
    a. These fixtures are very popular with amateurs for such plants as African violets, some orchids, and many other plants.
    b. Plants such as African violets, gloxinias, philodendrons, and orchids need to be placed six to ten inches away from the fluorescent growing tube. If placed too far away they will receive an inadequate light supply, resulting in thin leaves with long petioles.

D. All plants have a temperature range over which they grow best.
  1. Many house plants do well with day temperatures between 65 and 75 degrees.
  2. Foliage plants generally require a night temperature of 60 to 65 degrees, while flowering plants often perform best with night temperatures of 50 to 60 degrees.
  3. Some flowering plants, such as gloxinias and African violets, need night temperatures above 60 degrees. The flower color is more intense and the blooming period is longer for some plants in cooler temperatures.

E. The air of most homes with central heating becomes extremely dry which is not the best for the plants since they require higher humidity. The humidity can be increased by several methods:
  1. Check to make sure that the humidifier on the hot-air furnace is constantly filled with water.
  2. Place pans of water on radiators for evaporation.
  3. Use evaporator pans beneath the plants.
    a. Place pebbles, sand, gravel, vermiculite or a similar material in a tray or pan of water.
    b. Place potted plants in the tray.

    c. Be careful that the bottom of the container is not in the water.
    d. As the water evaporates it will increase the humidity.
  4. Electric vaporizers can be used.
  5. Spraying the foliage of plants with a fine mist is helpful. Be careful with hairy-leaved plants such as African violets unless the foliage can be dried quickly.
  6. Merely grouping plants together will be helpful in slightly increasing the humidity surrounding the plants.

F. A continuous supply of moisture is necessary for proper growth and development; however, the soil should not be kept waterlogged.
  1. Water the plants only when the soil feels dry to the touch.
  2. When watering, thoroughly moisten all the soil in the pot.
  3. Plastic and glazed containers hold moisture longer than regular clay pots and need less frequent applications.
  4. Many times, plants such as African violets are watered by placing the container in a saucer filled with water which the soil absorbs.
    a. This is helpful in keeping the hairy leaves dry.
    b. It is likely, however, that when this method is used exclusively that water evaporating from the soil surface could form a "salty" crust eventually causing damage to the plant. An occasional soaking by watering from above will help leach out these salts.
    c. In winter weather make sure that the water used is room temperature.

G. The proper soil for house plants is one with good drainage, a supply of nutrients, and an open texture.
  1. Average garden soil is usually unsatisfactory for potting when used alone.
  2. A good all-purpose soil mix for all plants--except cacti, orchids and bromeliads--is equal parts of a good garden loam, sand, and peat moss.

3. For cacti, use one-half part garden loam, one-half part peat moss, and two parts sand.
4. Orchid and bromeliads require a medium such as osmunda fiber, redwood chips, or shredded fir bark.
5. The soil used for house plants should be sterilized in order to kill harmful organisms, diseases and weed seed.
    - a. This can be done at home by adding a cup of water to each gallon of the mixture and heating in the oven at 180 degrees for at least 30 minutes.
    - b. Potting soil may be purchased commercially. It is a well-balanced mixture, sterilized and ready to use.

H. There are several jobs that are necessary as a part of day-to-day care.

1. Repotting is necessary whenever the plant fills the soil in the container with roots.
    - a. Inspect the rootball by inverting the plant while holding the soil with one hand.
    - b. Tap the edge of the pot on a solid object, allowing the root ball to slide out of the container.
    - c. If the soil is filled with roots they will show outside the soil.
    - d. If the soil ball crumbles, the roots still have room in which to grow and the plant can be placed back in the same container.
    - e. When repotting, be sure to replant in a container one size larger than the previous one.
        - 1) One of the most common errors is using a pot that is too large.
        - 2) The drainage hole in the bottom of the container should be covered with a piece of a broken clay pot. A shallow layer of pebbles or gravel is added next.
        - 3) This is followed with potting soil.
        - 4) The plant is then placed in the center of the container and held in place with one hand while soil is added with the other.

        5) Firm the soil carefully around the roots. Leave approximately one-half inch of space at the top to allow for watering.

2. Fertilizers are available as powders, tablets or liquids. All are satisfactory.
    a. They should be applied according to instructions on the container.
    b. Whether or not a plant needs fertilizer depends on the plant.
    c. Some indications of a need for fertilizing are: pale green leaves, decline in flowers, short stems, and slow root growth. Many plants go into a semi-dormant stage from about mid-fall until mid to late winter; they are probably better off without fertilizer at this time, because, due to low light and short days, any growth made will likely be weak and spindly.
3. Once a week, take each plant to the kitchen sink, bathtub or other suitable area and clean the leaves with a gentle spray of tepid water to remove dust and insect eggs and to discourage spider mites.
    a. Large plants can be cleaned with a moist tissue or soft cloth.
    b. A soft paint brush can be used to clean the hairy-leaved plants.
4. Remove withered leaves, stems and faded flowers. Pinch the tips of any branches necessary to induce bushiness.
5. Spray weekly with a house-plant pesticide to prevent trouble from insects.

I. After a long winter inside, plants benefit from a summer vacation outside.
    1. Do not take them out until all danger of a late frost is safely past.
    2. When moved outside place them in a protected spot and allow them to get adjusted to the outside conditions gradually; otherwise, the sun and wind can practically ruin a tender plant.
    3. Bring them in the house early in the fall, well before the first frost is expected, so that they can adjust gradually to the change from outside to inside.

J. Some common house plant troubles are:

Symptoms	Cause	Treatment
Leaves appear lifeless; plant wilts frequently, requiring watering daily.	Too much heat or pot too small.	Lower temperature or transplant to a larger pot.
Leaf margin dried and brown; new growth quickly withers.	Too much heat, too low humidity, or uneven soil moisture.	Lower temperature, increase humidity, and avoid letting the soil get extremely dry and then flooding.
Yellowish-brown and/or silvery spots on the foliage. Leaves curl under.	Too much sun; often occurs when plants are outside in the summer.	Give the plant increased shade.
Stems turn mushy with a brown or black rot. Leaves wilt.	Too much water.	Water less frequently. Make sure the drainage hole in the container is not blocked.
Lower leaves yellow and falling; tips of leaves are brown and wilt.	Inadequate water.	Water the plant until water runs out of the drainage hole in the pot. Water again when the soil feels dry to the touch.
Plant is stunted; lower leaves turn yellow and fall off; new leaves are undersized. Color of foliage is pale green.	Inadequate fertilizer.	Fertilize more often with a house-plant fertilizer. Follow directions on the container.
Leaves are brittle and easily broken, dark green in color with rank, heavy foliage.	Excess of nitrogen fertilizer.	Discontinue feeding temporarily. Water heavily to leach excess nitrogen out of root zone.

Symptoms	Cause	Treatment
No flowers.	Inadequate light. Lack of moisture. Excess fertilizer.	Increase light. Keep soil evenly moist. Fertilize less frequently. Decrease the nitrogen content.
Flower buds drop.	Unfavorable growing conditions.	Avoid temperature extremes or widely fluctuating temperatures. Keep plant out of drafts. Increase humidity if low.
Whitish or yellow spots on leaves, especially noticeable on African violets and other hairy-leaved plants.	Cold water on foliage.	Use tepid water on plants.

NOTE: The number one cause of houseplant failure is lack of light.

K. Some foliage plants for the home are as follows:

1. Philodendron
2. Palm
3. Dieffenbachia
4. Ficus (rubber plant, fiddleleaf fig)
5. Scheffera (umbrella tree)
6. Caladium
7. Croton
8. Begonias
9. Ivy
10. Fittonia
11. Syngonium
12. Grape Ivy
13. Peperomia
14. Norfolk Island Pine
15. Dracaena
16. Ferns
17. Aspidistra
18. Sansevieria
19. Bromeliads
20. Cactus
21. Jadeplant
22. Coleus
23. Spider Plant
24. Aluminum Plant

L. Some flowering plants for the home include:
   1. African violets
   2. Gloxinias
   3. Amaryllis
   4. Geranium
   5. Begonias
   6. Cyclamen
   7. Poinsettia
   8. Episcias
   9. Abutilon (Flowering Maple)
   10. Crossandra
   11. Bougainvillea
   12. Aphelandra
   13. Fuchsia
   14. Hoya (wax plant)
   15. Kalanchoe
   16. Zygocactus (Christmas cactus)
   17. Lantana
   18. Clivia (Kafir-lily)

III. Natural Gardens

A. Natural gardening is not trying to imitate nature; rather, it is working with her. It is a woodland where the homeowner can create a landscape that is easy to care for and one that will always be attractive.

B. In a natural or woodland garden, plants are not spaced at regular intervals; there are no straight lines. Curves and drifts of plants are used to give the area a natural and informal look.

C. A natural helper such as a rock or stream will add to its authenticity.

D. Native woodland soil is rich in humus. If the site for such an area is lacking in humus, it must be added in the form of leafmold, compost, old manure, etc.

E. In collecting the plants for the garden, a person must be aware of the fact that in most states woodland plants are protected by law.
   1. The best source of such plants is from nurseries which specialize in native plants.
   2. Nursery-grown plants should be more robust than wild plants.

F. Some nurseries selling wildflower plants and seeds are listed below:

1. Orchid Gardens, Route 3, Box 224, Grand Rapids, Minnesota 55744
2. Highlands Nursery, Boxford, Massachusetts 01921
3. Putney Nursery, Putney, Vermont 05346
4. Midwest Wild Flowers, Box 664 A, Rockton, Illinois 61072

G. Wild vines climbing over a fence or up a tree will add graceful charm. Virginia creeper or bittersweet may be likely candidates for such a chore, as would wild grape.

H. Surfacing of a path with sawdust, wood chips, or pine bark or needles will result in an attractive, natural-appearing feature.

I. Undesirable underbrush and seedling trees should be thinned and removed.

J. If native shrubs are not in the area, add some of them. Mountain laurel, rhododendron, azaleas (deciduous and evergreen) are just a few examples.

K. Daffodils do extremely well in areas exposed to full sun in the spring.

L. Plants for the Natural Garden

1. Columbine
2. Jack-in-the-pulpit
3. Foxglove
4. Dogtooth violet
5. Virginia bluebells
6. Several types of ferns
7. Trillium
8. Daisy
9. Lady's slipper
10. Milkweed
11. Queen Anne's Lace
12. Primrose hosta
13. Shrubs
14. Azalea (rhododendron, many kinds)
15. Red-twig dogwood
16. American witch hazel

17. Mountain laurel
18. Viburnums

Suggestions for Teaching the Lesson

I. Developing the Situation

A. Things to be brought out by the teacher:
   1. As the homeowner works in the garden, a particular type of plant or a particular style of garden will become of greater interest than others.
   2. Many gardeners become somewhat of a specialist or amateur authority on certain plants, for example, roses, daylilies, iris, etc.
   3. Homeowners often develop collections of houseplants for enjoyment inside as well as for summer decoration for areas such as the patio.

B. Things to be brought out by the class members:
   1. Personal experiences in growing houseplants, roses, wildflowers or other specialty interests.
   2. Ideas as to how to develop a unique rose garden, natural garden or display of indoor plants.

II. Conclusions

A. Some gardeners may make a statement to the effect that even though roses are attractive, they are too much trouble. In reality, if they are given regular care and preventive maintenance, they do not require much additional time over other flowering perennials.

B. House plants are a hobby for people of all ages, have a place in every home, and serve as decorations for numerous occasions.

C. As with all plants, houseplants require favorable soil, temperature, light, food, moisture, and humidity to be rewarding.

D. Preserving trees and wild plants has a special meaning today because of the emphasis on natural beauty and the environment.

E. Wildflowers do not necessarily have to be limited to woodlands. Native plants can sometimes be grown in the shade of a wall, under a tree as a patio decoration, or in the foreground of shrubs.

III. Enrichment Activities

A. Visit any wildflower gardens in the area.

B. Visit rose gardens.

C. Visit a nursery that handles a large line of house plants as well as roses.

D. Tour a natural garden.

E. Design natural planting plans for different kinds of yards.

IV. Suggested Teaching Materials

A. References

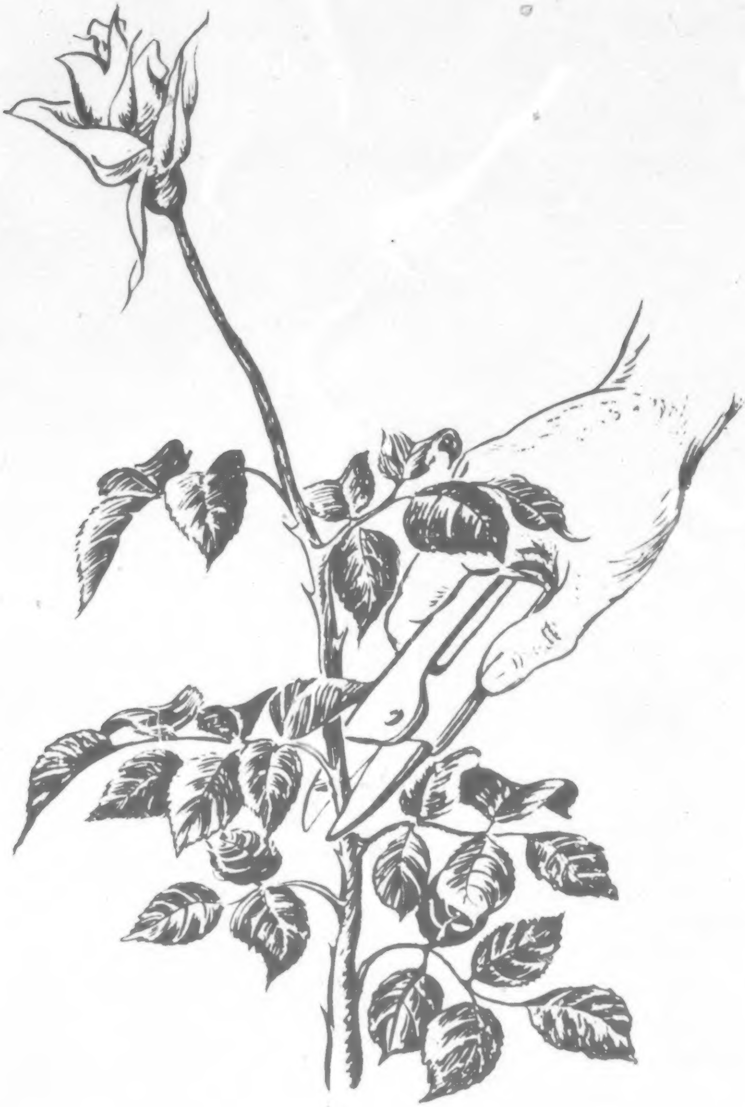
1. Approved Practices in Beautifying The Home Grounds, pp. 265-275.
2. Better Homes and Gardens House Plants.
3. Better Homes and Gardens New Garden Book, pp. 162-177.
4. Flowering House Plants, Time-Life Books.
5. Flowering House Plants, Month-by-Month by Jack Kramer.
6. Foliage House Plants, Time-Life Books.
7. Gardening and Home Landscaping by Jack Kramer, pp. 309-314.
8. Gardening Indoors Under Lights by Frederick H. Kranz and Jacqueline L. Kranz.
9. Home Floriculture, Correspondence Course No. 86, The Pennsylvania State University, Lesson 6.
10. House Plants for Your Home, Correspondence Course No. 144, The Pennsylvania State University.
11. Landscaping and The Small Garden by Marjorie J. Diltz, pp. 142-143.
12. Rose Gardening, Correspondence Course No. 149, The Pennsylvania State University.

13. Roses, The Time-Life Encyclopedia of Gardening.
14. So You Want to Grow Roses by Viva Penick Wright.
15. The Complete Book of Roses by Dorothy H. Jenkins.
16. The Complete Gardener by Lois Wilson, pp. 230-239.
17. The World Book of House Plants by Elvin McDonald.

B. Resource Personnel
  1. Consult local sources
  2. Extension specialists
  3. Refer to VoAg Directory of Resource People in Kentucky

C. Audio-Visuals
  1. Master
    -1 Pruning Roses

Cut roses to leave at least two leaflets between the cut and the main stem.



Source: USDA

Adult 110-9-1

Lesson 10

PLANT PROPAGATION

Objective -- To develop the effective ability of homeowners to successfully propagate ornamental plants.

Problem and Analysis -- How can we successfully propagate ornamental plants?

-Seed propagation
-Division and separation
-Cuttings
-Layering
-Grafting and budding

I. Seed Propagation

A. Many shrubs and trees can be propagated by home-saved seed; however, it is best not to save seed from a large number of perennials as well as annuals, many of which are hybrids whose resultant seed will not produce plants identical to the parent. It is a necessity that the homeowner purchase new seeds for each crop of these plants.

B. All seed have definite requirements concerning moisture, temperature, air, and light which must be met if they are to germinate satisfactorily.

1. The most favorable moisture level for seed germination is the maximum that the medium can hold under its own force but still not limit aeration
2. Individual plants vary in temperature requirements for seed germination.
    a. A large number of plants germinate best at 68-70 degrees.
    b. A good rule of thumb to follow is that plants generally germinate best in a temperature about the same as the daytime shade temperature at which the plants grow best.

    - c. For cool-season crops that grow best in the spring or fall, this means a temperature of about 60-65 degrees.
    - d. For warm season crops 70-75 degrees is required.
  - 3 The maximum amount of air for seeds is available at the soil surface; however, since moisture supply is more favorable at greater depths, a compromise must be made between air and moisture in selecting the proper depth. The usual rule is to cover seeds to a depth of three times their diameter.
  - 4. Some seeds will not sprout in darkness. Generally, the seed pans should be placed in full light.

- C. A disease called "damping-off" kills many seedlings started inside.
  - 1. Damping-off is a fungus disease that causes the little seedlings to rot at the soil line and fall over.
  - 2. It is most destructive in areas of little ventilation and high moisture.
  - 3. A sterile seeding media is a necessity in order to cut down on the possibilities of introducing this disease.
  - 4. Some satisfactory media are listed below:
    - a. "Jiffy-mix" or "Peat-lite" are names given to commercially prepared mixes available from most seedsmen and many garden centers. These mixes are sterilized and thus highly recommended.
    - b. Vermiculite is a form of expanded mica and gives excellent results.
    - c. Finely milled sphagnum moss.
    - d. A mixture of equal parts vermiculite, milled sphagnum, and perlite.
    - e. A mixture of equal parts of peat moss and sand.
    - f. Packaged soil mixes are satisfactory as long as they have been sterilized.

- D. Seeds can be planted in containers inside or in a coldframe outside. This will result in an earlier start than waiting to sow directly in the ground where they are to grow.

E. Naturally, plants of annual flowers are sown in the spring to provide flowers all during the growing season. Perennials are usually seeded during the summer to start flowering the next year.

F. When seed that have been started indoors have germinated and the first set of true leaves are present, they are ready for transplanting.
   1. This is necessary in order that they will have adequate room in which to develop.
   2. The first leaves that emerge are called seedling leaves and are not typical of the true leaves.

G. In order to provide heat needed to germinate many seeds, it is recommended that a thermostatically controlled heating cable be placed under the container in which the seeds are planted.

H. Additional tips on growing plants from seed are:
   1. Delphinium seeds, when started indoors in the spring, should be given cold treatment by placing in the refrigerator a few days before seeding.
   2. Seeds that have a pulpy covering should have this covering removed.
   3. Fine seeds like petunia or begonia should be sprinkled on top of the media and not covered.
   4. Covering the container of sown seed with plastic or a piece of glass will help prevent the loss of moisture and will result in more even germination.
   5. Seeds of many woody plants have hard seed coats which are impervious to water. Notching of the larger seeds with a file will allow moisture to soak into the seed.
   6. When considering annuals, perennials, biennials, trees and shrubs together, the gardener should understand that some seeds are best sown as fresh seed, some need an after-ripening period for best germination, and some need a period of freezing for germination.

7. To get seed from the cone-bearing trees, gather the cones in the fall when mature.
   a. Place the cones in a 200 degree oven for one hour.
   b. During this period the scales will open, allowing the seed to fall out or be easily extracted.

II. Division and Separation

A. One of the easiest and simplest propagating techniques is that of dividing old specimens into smaller plants. Most perennials need to be dug up, divided and reset at fairly regular intervals.
   1. Chrysanthemums should be lifted each spring and separated into single stem plants and reset. This keeps them young and vigorous.
   2. Daylilies, phlox and iris should be divided every three or four years.
   3. Perennials such as bleeding heart and peonies can be allowed to grow for several years before being divided. In fact, peonies can go indefinitely without being divided as long as they are blooming satisfactorily.

B. The tuberous roots of dahlias will not produce a plant unless a portion of the stem containing one or more buds is left attached to each tuber when dividing the clump.

C. Gladiolus grow from a structure known as a corm.
   1. During a season's growth, a new corm forms above the old one, at the base of the new stem, and the old corm shrivels and becomes detached.
   2. Small corms, called cormels, form between the new and old corms. These may be separated and planted but require several years to produce a blooming-size plant.

D. Many popular garden plants grow from structures known as bulbs.
   1. Included in these are lilies, tulips, narcissus, and hyacinths.
   2. Most of these naturally form new bulbs

[redacted]

underground which can be separated and planted separately.

3. On certain plants, such as the lilies, small bulbs form on the stems above ground and are called bulbils. These can also be planted in the ground and in a few years will be a blooming-size plant.
4. Notching and scooping are processes which can be practiced on bulbs such as hyacinth to increase the number. It should be pointed out that this method requires several years to produce bulbs large enough for flowering.
   a. Notching consists of cutting notches ¼ inch wide and ½ inch deep across the base of the bulb, going through the center so as to form a wheel pattern.
      1) Four such notches would be adequate for a fairly large bulb.
      2) The cuts are made before planting in the fall. Bulblets form in the notches.
      3) They are removed at the end of a season's growth and replanted in an area where they can develop into blooming size plants.
   b. Scooping consists of cutting out the base of the bulb, leaving a concave surface in the bulb.
      1) This also is done before fall planting.
      2) Bulblets form along the cut margins of the layers.
      3) They can be removed after one season's growth and replanted to develop into mature bulbs.

2. Bulbs, such as amaryllis, can be cut from bottom to top into wedge-shaped pieces and each piece planted in moist, light medium to about 3/4 of their usual depth.
   a. New plants form along the cut edges.
   b. When large enough, they can be potted individually.
3. Many bulbous plants, such as lilies, can be propagated by detaching the fleshy scales and planting them upright in moist, light soil.

a. They are planted at a depth equal to 1/2 their length.

b. Each scale will produce from one to five bulblets which can be separated and planted.

4. Some plants, such as the one referred to as hen-and-chicks (Sempervivum), produce offsets at the end of runners. The foliage and roots grow while still attached to the mother plant; when removed they grow readily.

III. Cuttings

A. Cuttings may be taken from the roots, stems or leaves.

B. Softwood cuttings of deciduous plants are made when the growth is young and tender.

1. These are taken in the late spring or early summer.
2. A sharp instrument should be used to remove vigorous shoots from the parent plant.
3. Remove any leaves that would be covered when inserted into the rooting medium.
4. They need watering often enough to keep the medium moist.
5. It is helpful if they are enclosed with plastic or some such material to increase the humidity.
6. In a few weeks, when good roots have formed, they may be transplanted into fertile soil.
7. House plants, as well as many shrubs, can be successfully propagated by softwood cutting.

C. A semi-hardwood cutting is one taken in the late summer or early fall when the plants have practically completed the season's growth but are still in foliage.

1. Semi-hardwood cuttings require longer to grow roots than do softwood cuttings.
2. Many shrubs and trees, both deciduous and evergreen, can be propagated by this method.

D. Hardwood cuttings are taken in the late fall to early spring after the plants have lost their leaves and are in the dormant stage.

1. Hardwood cuttings taken from deciduous plants in the fall should be tied in bundles and buried in moist sand or sawdust.
2. They must be covered sufficiently to prevent freezing.
3. They should be buried in a vertical position with the tops downward.
4. While in storage, it is expected that callus tissue will form. Callus tissue is a spongy healing tissue that forms on the cut surface of cuttings.

E. Hardwood cuttings may also be taken in late winter just before warm weather arrives. Such cuttings, if placed in a plastic bag containing a small amount of moist peat or sphagnum moss, can be stored for a short period in a refrigerator.

F. Evergreens, both needle-leaf and broadleaf, can be readily propagated by stem cuttings.

1. Most evergreens are propagated by semi-hardwood cuttings made in August.
2. They are then placed in the coldframe.
3. Usually they do not form roots until the following spring.
4. If a greenhouse is available for propagation, the cuttings may be taken any time from August to February.
5. Each cutting is usually six to eight inches long.

G. Leaf-bud cuttings consist of a well-developed leaf with a portion of the stem so as to include the bud just above the leaf base.

1. Such a cutting is placed in the medium with the bud and stem tissue just barely covered.
2. These cuttings can be made when the plant is in the softwood or semi-hardwood stage.
3. Many houseplants as well as ornamental shrubs can be propagated this way. They include azalea, rhododendron, croton, pathos and philodendron.

H. Many plants, especially houseplants, can be propagated with leaf cuttings.

1. Such a cutting merely consists of a leaf, including a portion of the petiole or leaf

stalk, which upon insertion in the proper medium is able to produce a plant.

2. Plants commonly propagated in this manner include: African violet, peperomia, rex begonias, sansevieria, and kalanchoe, as well as many others.
    - a. The leaves of sansevieria can be cut into sections and each section inserted in the medium.
    - b. A plant will grow from each section.
    - c. A rex begonia leaf can be cut into wedge-shaped sections and each section which contains a large vein will produce a plant.
    - d. The entire leaf can be laid on the medium, with the underside on the surface, and secured with a paper clip or toothpick inserted through the leaf.
        - 1) The large veins are cut with a razor blade or other sharp instrument.
        - 2) New plants will grow at each cut.

I. Root cuttings consist of a four to six inch long root section planted in an erect position in the rooting medium.

1. The uppermost end is on top and covered with on to two inches of the medium.
2. Any plant which naturally sends up suckers from the root system can be successfully propagated by root cuttings; however, this method cannot be used to propagate a plant variety which has been grafted to a special rootstock.
3. Some plants which are propagated by this method are lilac, phlox, crapemyrtle, and dracaena.

J. The material in which the cuttings are placed for rooting is called the medium; it should be of such a composition that it holds moisture but still allows for good aeration, and is free of organisms which cause disease.

1. Sand is widely used as a rooting medium. It does require frequent watering.
2. A mixture of sand and peat gives good re-

sults (1/3 to 1/2 peat prevents the sand from drying out so fast).

3. Vermiculite is loose and holds water well, making it very satisfactory.
4. Perlite is very similar to vermiculite.

K. Coldframes, large pots, greenhouse benches, and plastic sweater boxes are only a few examples of the wide range of possibilities for placing cuttings for rooting.

L. The use of heating cable or some similar material to supply bottom heat will help promote the development of roots.

M. Humidity is also an important factor in promoting root development.

1. Polyethylene plastic can be used to make a "tent" over containers holding cuttings to help hold the humidity and prevent wilting.
2. Sprinkling of the surrounding area several times daily also helps maintain a favorable humidity.
3. Probably the most effective aid in preventing wilting of softwood cuttings is misting.
   - a. Nozzles are placed over the cutting bed to provide a fog-like mist over the entire area.
   - b. Automatic controls are available to help maintain the proper moisture level.
   - c. This system can be used in a greenhouse as well as outside in a coldframe or open bed.

N. Rooting hormones sold commercially under names such as "Rootone" or "Hormodin" speed up the root-formation process when used on cuttings.

1. The cut portion of the cutting is moistened and then dipped into the hormone.
2. Any excess hormone is removed by shaking, after which the cutting is inserted in the medium.
3. Only a very small amount of hormone is needed for a cutting. One teaspoon of hormone will easily treat well over 100 cuttings.

O. When roots have developed on the cuttings, they should be placed in rich, porous soil.
   1. They can be set in pots, benches, nursery beds, in the garden, or any other suitable location.
   2. They need close attention until they are of a satisfactory size to be placed in a permanent location. This attention means watering, protecting from insects and diseases and, in some cases, shading from too strong sunlight.

IV. Layering

A. Layering could be defined as a method of rooting cuttings while they are still attached to the parent plant. Only after roots have formed are they removed from the parent plant, and placed in a fertile soil.

B. Tip layering consists of pinning the tip of a branch to the ground with a loop of wire, clod of soil, or a rock.
   1. In a few weeks, the buried tip will produce new roots and a new plant.
   2. It can then be cut from the parent plant, dug up, and moved to a new location.

C. If a large number of new plants are desired, the gardener may practice continuous or serpentine layering.
   1. In continuous layering, an entire shoot or stem is placed a few inches below the ground, leaving only the tip of the branch exposed to ensure continued growth.
   2. The cutting of notches at the nodes and insertion of a small piece of wood, such as a toothpick, to hold the wound open will increase the likelihood of root formation.
   3. A modification of continuous layering is called serpentine layering. In this method the stem goes in and out of the ground alternately.
      a. The stem should again be notched at the nodes underground.
      b. The roots develop from the nodes underground while shoots grow from those above.

D. Mound layering may be used on almost all shrubs, but it is particularly recommended for shrubs with branches too stiff to bend to the ground, such as quince, barberry, and crabapple.
   1. Such plants are cut off, leaving only short stubs.
   2. When new shoots have started on these stubs they are notched near the base.
   3. Soil is then mounded over the stubs, covering the base of the new shoots and the notched area.
   4. After roots have formed, the rooted sprouts are removed from the parent plant and placed in the desired location.
   5. The original parent plant may be used over and over again for mound layering.

E. Air layering is also used on stems that are too stiff to be bent to the ground.
   1. It is also used on houseplants that have grown tall and lost several bottom leaves.
   2. The stem is notched by making an upward cut through the bark and slightly into the wood.
   3. A toothpick is inserted to hold the wound open.
   4. The slit is then dusted with a rooting hormone.
   5. The cut is wrapped with moist sphagnum moss.
   6. The moss should then be covered with plastic film and tied at both ends.
   7. If properly done the moss may not have to be watered again until roots have formed.
   8. When roots can be seen through the plastic film, the stem is cut from the plant just below the air layered section and potted as an individual plant.

V. Grafting and Budding

A. Grafting may be needed for several reasons:
   1. To propagate plants which do not come true from seed.
   2. In the case of roses, grafting is done to increase the vigor of the plants.
   3. Propagation of outstanding ornamental plants in large numbers can easily be done by grafting.

4. To propagate plants whose cuttings do not form roots easily.
5. To bring about changes in the characteristic of the plant such as dwarfing or resistance to insects.
6. To change the form of a plant. Example: tree rose.

B. The two plant parts used in grafting are the rootstock and scion (stem).

C. The basic principle in grafting is that the cambium layers of the two pieces are in contact.
   1. The cambium layer is found immediately under the bark.
   2. The two pieces are held in place with materials such as grafting wax or grafting tape.

D. In tongue or whip grafting, a scion and rootstock of the same size are selected.
   1. A slanting or diagonal cut is made on the end of each that will be joined together.
   2. A sharp, thin-bladed knife is used to split both the scion and rootstock about the center to a depth of 1/4 to 1/2 inch.
   3. The two pieces are fitted together so that the tongues interlock and the cambium layers come into contact, at least on one side.
   4. The graft is protected from drying by binding with grafting tape or using grafting wax.
   5. As soon as the two surfaces are grown together the binding can be removed.

E. When the diameter of the rootstock is considerably greater than that of the scion, the cleft graft can be made.
   1. The rootstock is cut off straight across at the top.
   2. It is then split with a grafting tool or a stout, sharp chisel.
   3. A narrow wedge is then inserted in the split to hold it open to receive the scions.
   4. This wedge is removed upon insertion of the scions.
   5. The scions, usually two, are cut to a wedge

shape at their lower ends.

6. They are inserted into the cleft made in the rootstock, one on each side.
7. After it is determined that the cambium layers are in contact and the wedge is removed, the graft is covered with grafting wax.
8. Particular attention should be given to see that the split in the rootstock is completely filled.

F. A variation of the procedure in grafting is called budding. Still the basic principle must be followed, that the cambium layers of the two must come in contact.
   1. The scion consists of a single bud cut with a shield shaped piece of bark included, but little if any, wood tissue.
   2. A T-shaped cut is made through the bark of the rootstock.
   3. The bark is loosened just enough to fit the bud under the bark of the rootstock.
   4. The area is then wrapped with soft twine, rubber bands, or etc., to hold the bud firmly in place.
   5. Once it has been determined that the graft is a success, the binding is removed so as to prevent interference with growth.
   6. Budding is done during the growing season when the bark easily separates from the wood.

Suggestions for Teaching the Lesson

I. Developing the Situation

   A. Things to be brought out by the teacher:
      1. Propagation of his own plants will reduce considerably the cost of plants to the homeowner.
      2. Successful propagation is satisfying and enjoyable.
      3. Plants may be propagated by sexual reproduction or asexual reproduction. Sexual reproduction is producing new plants from seed. Asexual reproduction is using a vegetative portion of the plant (root, stem or

leaf) to induce the development of new plants.

4. Propagation by seeds cannot be relied on exclusively because:
    a. Many plants produce no seeds; or if seeds are produced, they are produced so infrequently that a sufficient number of new plants cannot be obtained.
    b. Many plants do not come true from seed. This is especially true with hybrid plants.

B. Things to be brought out by the class members.
  1. Experiences with:
    a. Seeding, including planting of some seeds that did not "come true."
    b. Division and/or separation
    c. Cuttings
    d. Layering
    e. Grafting and/or budding

II. Conclusions

A. Plant propagation by the homeowner is an economical way to increase the number of plants.

B. Plant propagation is not difficult, but it does require close attention to a few details.
  1. Strict sanitation must be practiced.
  2. Correct moisture is necessary.
  3. The proper humidity must be maintained.
  4. The correct temperature and light intensity must be provided.
  5. Proper techniques must be utilized in asexual means of propagation.

III. Enrichment Activities

A. Practice by class members in performing the following:
  1. Seeding
  2. Division and/or separation
  3. Making and inserting cuttings
  4. Layering (air-layering could be easily used for classroom practice.)
  5. Grafting and budding

B. Have on hand for display and observation a variety of media satisfactory for seeding and/or cutting propagation, and articles used in grafting and budding.

C. A field trip to observe the results of budding and grafting.

IV. Suggested Teaching Materials

A. References

1. Approved Practices in Beautifying the Home Grounds by Norman K. Hoover, pp. 145-148.
2. The Complete Illustrated Book of Garden Magic by Roy E. Bilis, pp. 253-274.
3. Plant Propagation in Pictures by Montague Free.
4. The American Home Garden Book and Plant Encyclopedia, pp. 307-328.
5. Gardening and Home Landscaping by Jack Kramer, pp. 63-63.
6. Nature's Guide to Successful Gardening and Landscaping by William Flemer III, pp. 267-293.
7. Propagation of Plants, Correspondence Course No. 11, The Pennsylvania State University.
8. The Complete Book of Growing Plants from Seed by Elda Haring.
9. Introductory Horticulture by E. P. Christopher, pp. 107-140.

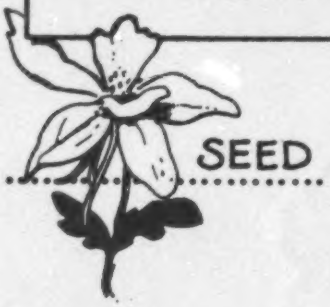
B. Resource Personnel

1. Consult local sources
2. Extension specialist
3. Refer to Vo-Ag Directory of Resource People in Kentucky.

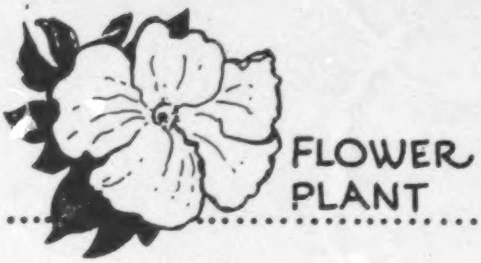
C. Audio-Visuals

1. Masters
    - -1 Flower Propagation
    - -2 Tongue or Whip Grafting
    - -3 Cleft Graft and Budding
    - -4 Kinds of Budding
2. Filmstrip, "Propagating Ornamental Plants." (Vocational Education Productions)

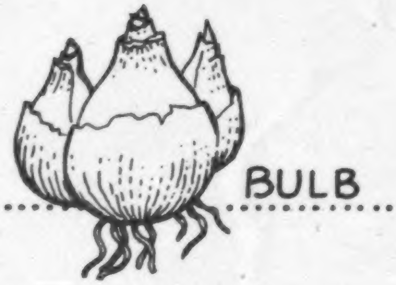
FLOWER PROPAGATION



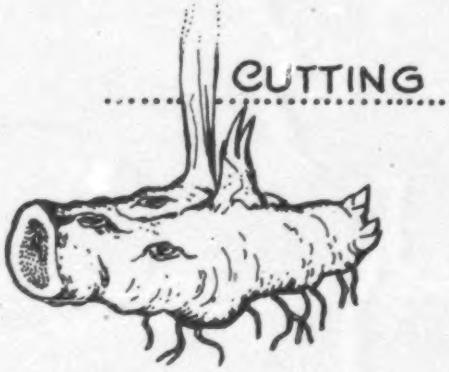
PLANT Perennial SEEDS at the time flowers normally mature and produce seed.. - EARLY FALL



Annual flowers (Petunias, etc.) are SEEDED or SPRING TRANSPLANTED



Bulbs, for spring blooming are FALL PLANTED, (Tulips, etc.)



DIVIDING (Rhizones) tubers, or corms, produce new plants.

FALL blooming → SPRING propagated
SPRING blooming → FALL propagated

[redacted]

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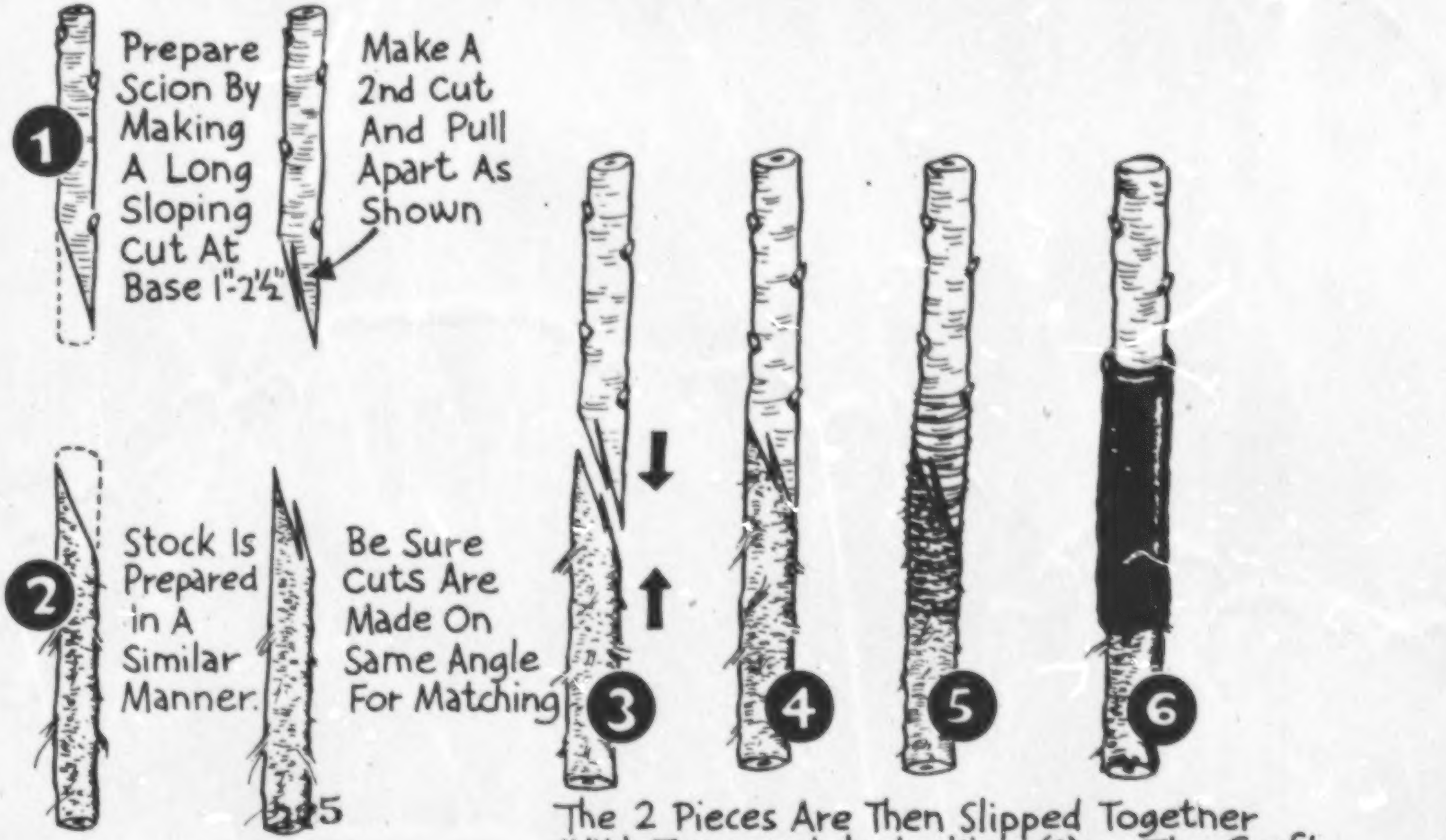
The WHIP or TONGUE GRAFT



Prepare Scion By Making A Long Sloping Cut At Base 1"-2½"

Make A 2nd Cut And Pull Apart As Shown

Stock Is Prepared in A Similar Manner.

Be Sure Cuts Are Made On Same Angle For Matching

The 2 Pieces Are Then Slipped Together With Tongues Interlocking (4). The Graft Is Then Tied (5), And Waxed (6).

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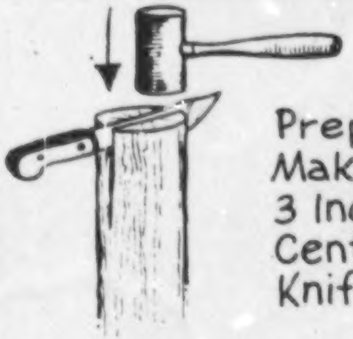
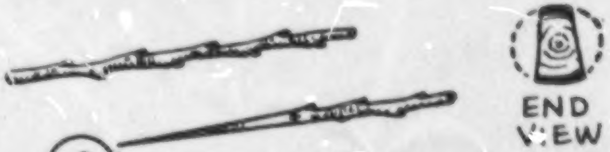
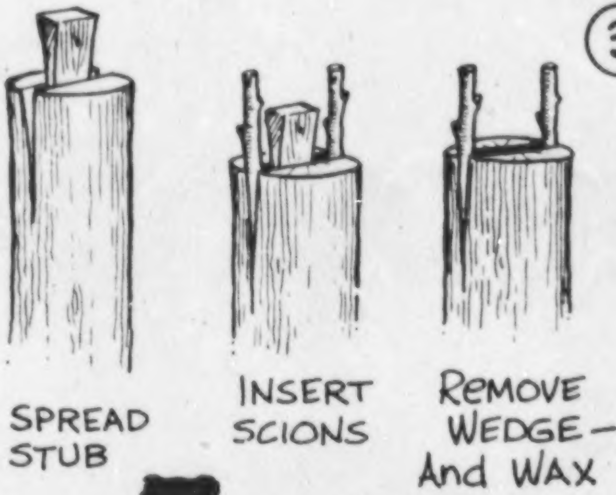
STEPS IN MAKING A CLEFT GRAFT



① Prepare Stub by Making a Split 2 or 3 Inches Down The Center With A Heavy Knife or Grafting Tool.



② Choose 2 Scions 3-4 Inches Long And Cut Into Wedges. (Outer Side of Wedge Must Be Wider Than Inner Side) Two or Three Buds Should Be On Each Scion.



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③ Spread Stub Open With Wedge Shaped Object & Insert Scions. Position So That The Cambium Layers Match-Then Remove Wedge. Scions Will Be Held Tightly By The Pressure of The Stock. Thorough Waxing of The Graft is Essential. (The Entire End of The Stub... The Splits Down The Side... And The Ends of The Scions)

[redacted] Adult 110-10-3

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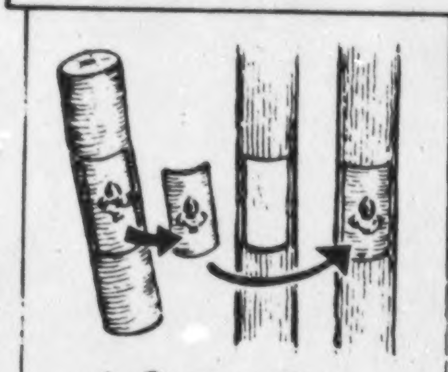
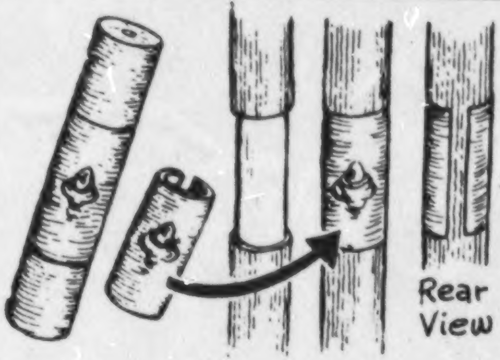
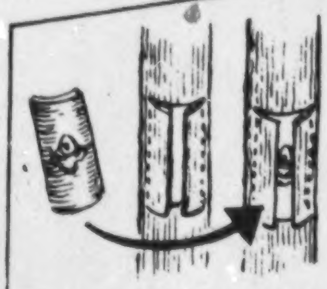
KINDS OF BUDDING



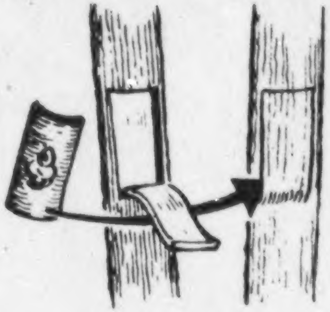
A PATCH BUD



A FLUTE BUD



AN I-BUD



A PLATE BUD

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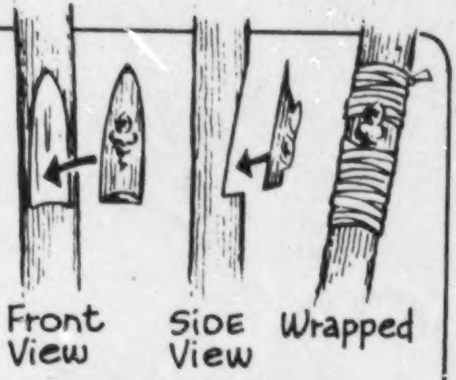
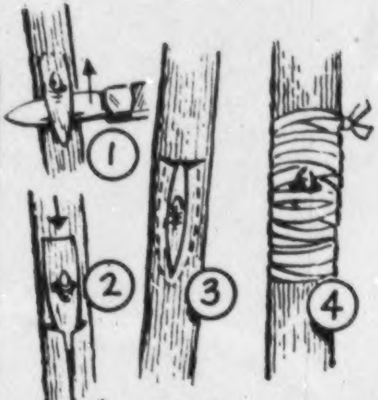


Front
View
Side
View
Wrapped

A CHIP BUD



A T-BUD

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APPENDIX

MY TEACHING PLAN FOR THIS COURSE

Why I am teaching this course (major learnings or outcomes expected)

ARRANGEMENTS FOR THE COURSE

Session No.	Date	Topic	Clock Hours

This page is for your convenience in planning and rearranging the content of this course to meet local needs and interests. Plan the course as it will be taught in the local school, showing the dates, class session number, topics, and the time in hours allocated to each topic.

TOPIC PLANNING FOR THIS COURSE

Name of Course ____

Name of Topic ____

Number of Class Meetings Allotted for this Topic ______________________

Teaching Objectives: (Learnings or outcomes for those enrolled)

Major Phases of the Topic: (Problems, jobs, areas, skills, key points, understandings, etc.)

Learning Activities: (Field trips, completing summary forms, panel discussions, demonstrations, etc.)

Teaching Materials Needed: (From resource material list or file)

RESOURCE MATERIALS FOR TEACHING

Unit ____________________ Lesson ____________________

Reference Books	Date Used	File Location
Other References: Bulletins, Magazines, Etc.		
Audio-Visuals: Slides, Filmstrips, Motion Pictures		
Magnetic, Flannel, and Bulletin Boards		
Charts, Maps, Posters		
Transparencies		
Specimens, Models, Mounts		
Human and Community Resources		

Please complete and return to:
Maynard J. Iverson
# 7 Dickey Hall
University of Kentucky
Lexington, Kentucky 40506

ADULT INSTRUCTIONAL UNIT EVALUATION

-- A Questionnaire for Kentucky VoAg Teachers of Adults

PART I -- GENERAL INFORMATION

How many years of teaching experience do you have? _______

How many years have you taught adults in agriculture? _____

How long has it been since you have taken your last college classwork in agriculture_____; in education _____; (undergraduate, graduate, or non-credit course)? ____________________

What is the highest degree you hold? ____________________

How many teachers are in your department?_________________

What age level students do you teach? (✓ one)
a) ____high school and adult b)_____adult only

How many other units from the University of Kentucky have you used in your teaching during the past few years?_____

PART II -- UNIT INFORMATION

NAME OF UNIT EVALUATED:____

TYPE OF CLIENTELE TAUGHT: _____Adult Farmer ____Young Farmer
_____Other Adults (please specify)____________________________

Average number attending class ______

Was the interest level _____high? _____moderate? _____low?

How many lessons did you use?_____ How many class periods?_____

Indicate any lesson you added or deleted____

____

____

____

Directions: Place a check mark (✓) in the appropriate left hand column to rate the following components of the unit based on your own observations. A ranking of 5 represents an excellent rating decreasing to a rank of 1 for poor. For the open-ended questions please write on the back if additional space is needed.

5	4	3	2	1	Unit Design
☐	☐	☐	☐	☐	General arrangement of parts
☐	☐	☐	☐	☐	Appropriateness of format for teaching adults
☐	☐	☐	☐	☐	Length of the unit
☐	☐	☐	☐	☐	Usefulness of suggestions for using the unit
☐	☐	☐	☐	☐	Number of lessons
☐	☐	☐	☐	☐	Order of lessons

Specific comments:____

____

[redacted]

PLEASE CONTINUE ON NEXT PAGE

Objectives in the Unit

5	4	3	2	1	
					Clearly stated
					Reasonable to reach in the allotted time
					Relevant to needs of the adult learner

Specific comments:____

____

Technical Content

5	4	3	2	1	
					Usefulness of introductory material
					Sufficiently detailed for direct use in class
					Related to objectives
					Divided into appropriate problem areas
					Up-to-date
					Accuracy
					Reasonably complete

Specific comments:____

____

Suggestions for Teaching the Lessons

5	4	3	2	1	
					Appropriate information for the teacher to bring out
					Appropriate items to be secured from class members
					Suitable conclusions
					Suitability of enrichment activities

Specific comments:____

____

Resources and Teaching Aids in the Unit

5	4	3	2	1	
					Up-to-date
					Accessibility to the teacher
					Relevance to the unit
					Adaptability to the teaching plan

Specific comments:____

____

With what parts of the unit do you feel you need additional help?

____None of them
____Objectives
____Content
____Course organization and planning
____References
____Resources and teaching materials
____Teaching methods
____Other (Specify)_______________________________________

PART III -- GENERAL REACTION

Please indicate any other strengths and weaknesses that you have observed in the unit and any suggestions for improvement, revision, and/or implementation (use the back of this sheet if needed).